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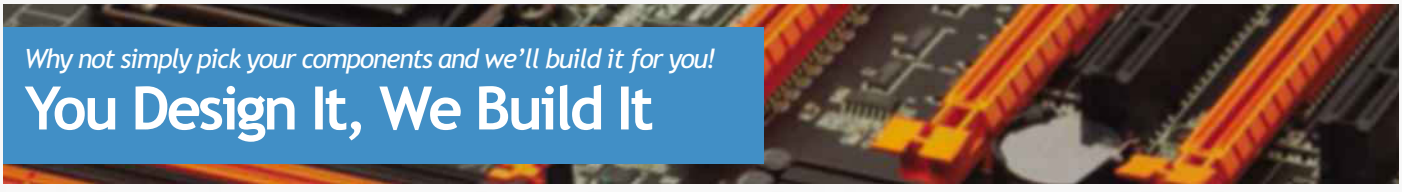

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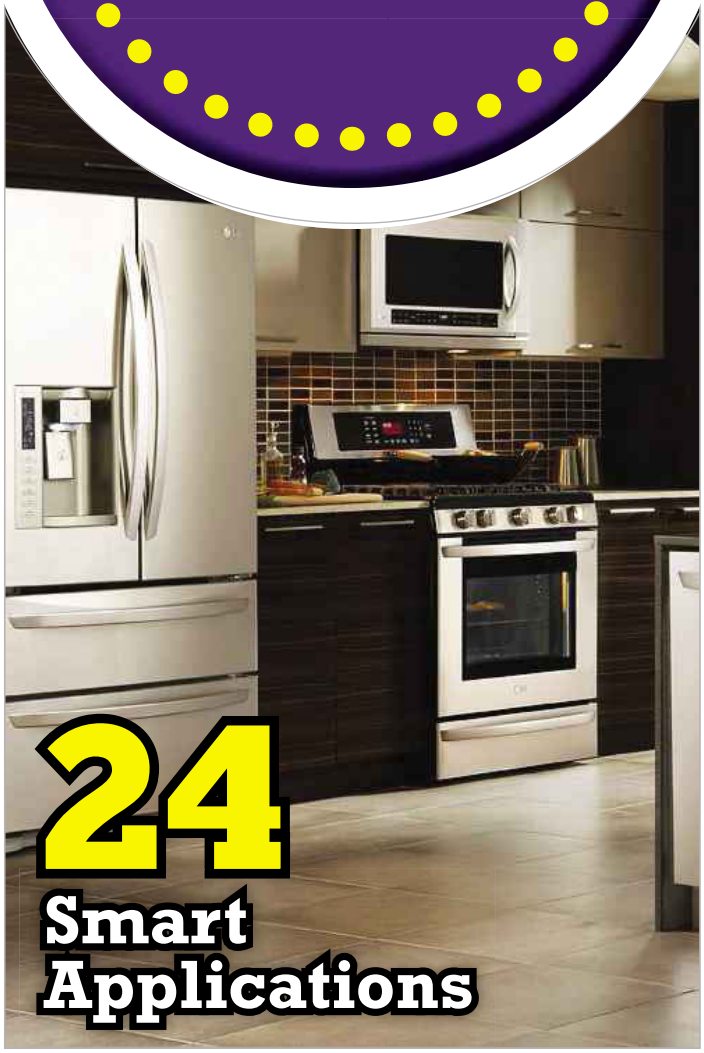

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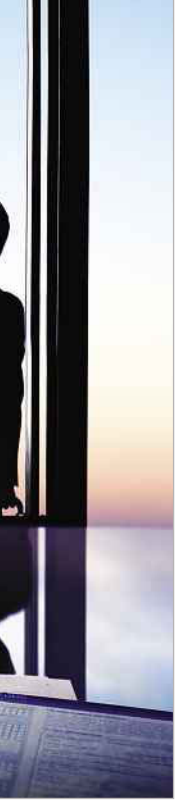

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56 Uses For An Old Android Phone

Every two years or so, many of us upgrade our smartphone to something newer and shinier. What happens to the old one, though? Well, you might sell it or trade it in, but why bother when you can actually use it for something? We take a look at some interesting ways to put an old handset to use

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The 51 Companies Microsoft And Google Have Bought Since The Start of 2014

David Crookes looks at what two of the planet's biggest and most cash-rich computer giants have been buying and why

In recent years, barely a week has seemed to go by without news of a major acquisition by a technology company, whether it be Facebook's $19 billion purchase of WhatsApp, the takeover of Autonomy by Hewlett Packard for a whopping $10.3 billion, the $7.4 billion paid by Oracle for Sun Microsystems or any of the host of 'smaller' acquisitions. The large monetary figures involved and the ubiquity of technology ensures these deals take on a meaning all of their own, not least because the companies doing the buying have managed to infiltrate our lives like never before.

There are many reasons for these deals. Most often, firms are looking to snap up an admirable pool of talent. Other times, they want to make in-roads into an area in which they have no history of influence. Thus by snapping up the patents, technologies, specialised systems and equipment their targets hold, companies can integrate new processes into their own and expand their reach.

Microsoft paid $8.5 billion for Skype's technology as a long-term successor to it's aging Live Messenger service, in a deal that also bought with it a customer-base willing to pay, rather than one that one which expected a service for free. It also eliminated a competitor, which some companies do simply by buying a company and shutting it down.

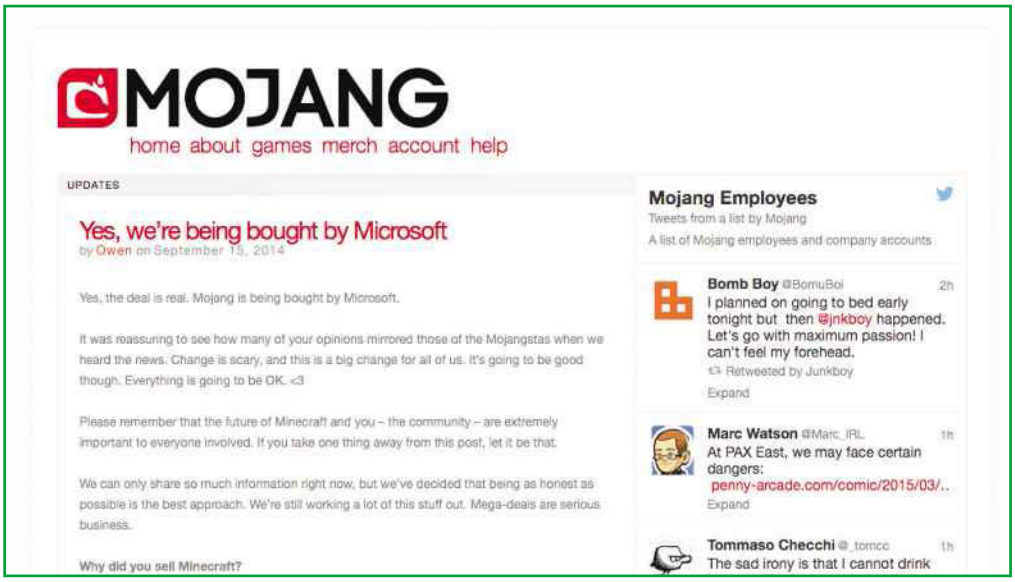
Indeed, over the past year or so, Microsoft has been very active in acquiring companies. It has bought smaller firms at a rate of around one every month. That's impressive, but pales when compared to the activities of Google which, over the same time frame, has opened its wallet for 38 acquisitions. Added together, these 51 firms have not only made billions of dollars for their founders, they have brought new ways of working to both tech giants, and allowed them to become bigger than ever. What's more, neither firm shows sign of slowing down. By the time you read this, we wouldn't bet against the number being higher than at the time of writing. The impact, however, will be the same.

Microsoft's Money

So what companies are being snapped up? Taking Microsoft first, we can see that at the beginning of 2014 it was rather interested in expanding its cloud computing portfolio. It announced an agreement to buy Parature in January – a decision Bob Stutz, corporate vice president of Microsoft Dynamics CRM, said would be a "perfect fit for every business", enabling it to "offer customers one of the best cloud-based solutions for customer self-service." A few months later, it was buying GreenButton "a leading provider of integrated on-demand solutions that allow customers to manage compute-intensive workloads in the cloud," according to Microsoft, which again was aiming its bows at businesses.

On the same day – May 1st – it also bought the mobile application Capptain, a Parisian start-up which provides app developers with analytics and the ability to send push notifications based on customer usage patterns. Like GreenButton, Capptain was integrated into Azure, Microsoft's cloud for modern business. The deal was akin to a final piece of the Redmond giant's jigsaw. It allowed enterprises to build mobile apps using Azure's suite of services while offering analytical powers. The Capptain deal also allowed businesses to target messages, announcements, information and offers depending on the behaviour of employees and customers. Suddenly, it was allowing Microsoft to catch up in an area it has long been left behind in: marketing services and the lucrative mobile ad space.

Most of Microsoft's acquisitions have been of a similar nature; that is, under-the-hood development tools to help solidify its position in a market. InMage became part of Microsoft Azure last July, allowing for backup, replication and recovery of data to the cloud during a system failure. Aorato built upon these security features by allowing



Sell, Sell, Sell

Companies such as Google and Microsoft don't exclusively buy other companies. They sell them too. Although they are rich enough to fold and forget purchases that haven't worked out (Microsoft has dropped the Nokia branding for phones, for example), they don't always do this.

At the start of 2014, Google sold what was left of Motorola's mobile phone operations to Lenovo and, at a stroke, told the world that it wasn't interested in such manufacturing. It's not an isolated incident either. Google sold SketchUp in 2012; Microsoft sold Bungie in 2011.

Sales are rare, though. There is always a risk that a sale could be successful for another company and diminish the products of the likes of Google and Microsoft. Of course you could say that these companies are not afraid of selling data but that's another story for another day.

for a better cloud-based defence for business. It is able to detect suspicious activity on a company's network and Microsoft deemed this such a useful tool that it made it its own in November.

Microsoft has been keen to bolster its toolset for developers, too. SyntaxTree was the creator of the UnityVS plugin for Visual Studio, allowing developers to author, browse and debug code for their Unity applications. Microsoft was able to use it to integrate support for Unity more deeply into Visual Studio when it bought it last July. When it subsequently purchased HockeyApp in December, it provided additional support to mobile developers with tools equipped for Windows Phone, Android and iOS. Hockey App provides user feedback tools, a beta distribution platform, test analysis and live crash reports.

Indeed, mobile is an important area for Microsoft and so, in December, it bought an app called Acompli, a mobile personal information manager for iOS and Android devices. It was very quick to re-brand Acompli as Outlook Mobile during a relaunch in January this year. So far it has been a success. By adding new IT controls, it has been positioned as the business app of choice which combines calendar synchronisation, contacts and email and it has been able to make use of the cloud-based initiatives which previous acquisitions have brought to the table. Outlook on Android has also been given customisable swipe gestures and there is across the board support for mail sync and push-like behaviour as well as real-time notifications.

It is clear from all of this, then, that business is very much at the forefront of the minds of Microsoft's decision makers, which is why they sanctioned purchases such as text analytics service Equivio (it will be closely integrated in the cloud-based Office 365 and enable businesses to sift through their mountains of data to help them work out their relevance in legal and compliance matters). The scooping up of Revolution Analytics has built upon this, showing an understanding that many companies are using the statistical and predictive analysis language R and so need a way of realising the potential of big data.

Minecraft Billions

All of this is interesting stuff to business-watchers, but a tad dry to the more general public – which is probably why these purchases have attracted far fewer headlines than some of the more consumer-focussed buy-outs. Chief among them have been the staggering $2.5 billion acquisition of Mojang last November and the more recent purchases of N-trig and Sunrise. Together they have seen many words written about them, creating a pool of analysis to which we are about to add.

Of the three, the Mojang deal was the one which had most people talking. For Mojang is the creator of *Minecraft*, the online building-block game that has become a monster following more than 60 million downloads and its grabbing of the coveted title of best-selling independent game of all time according to Guinness World Records. Over the past three years, fans have created more than 225 million Minecraft worlds on the Xbox 360 alone, which is not bad for a quirky indie title that gives gamers a blank slate on a deserted island, unleashing player creativity and allowing them

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to build, hunt, explore and fight. Who could have foreseen that players would produce their own narratives and be actively involved in such a rich community?

Minecraft also changed the way games were played by running in a browser, opening it up to everyone with a computer. It altered the way developers approached their own games by dispensing with stories, putting the player in control, emphasising creativity and giving a fresh spin to the fantasy genre. In fact, it's far less a game, more an experience – so for Microsoft to come in with an offer to buy the company was big news, and pundits rushed to have their say on its motivations. It was also a controversial decision. Leading gaming magazine *Games™* splashed with the headline "Will Microsoft Kill Minecraft?" an incendiary question that set the tone for a debate that still rages today.

So why did Microsoft buy Mojang? Quite aside from the fact that *Minecraft* will continue to make money (it will generate more cash for Microsoft than if its money was just sitting in a bank), the purchase of Mojang makes Microsoft an even stronger player in the gaming market. Games make up the bulk of purchases for mobile apps, they appeal to a young audience and they can attract a loyalty unseen in many other media. Given the success of its three Xbox consoles to date, Microsoft already has a good understanding of the gaming market and has made a commitment to it with Windows 10. By buying the developer of what is, perhaps, the most iconic and well-regarded game of the current day, it has a very valuable digital asset and one that it can bring to Windows Phone in an attempt to give that particular platform a boost among young purchasers.

Certainly, as we've seen with the purchase of Acompli, the mobile market figures highly for Microsoft. In buying Sunrise, one of the best calendar apps for Android and iOS, the company is going for quality to "exemplify Microsoft's ambition to rethink the productivity category," says Rajesh Jha, corporate VP of Outlook and Office 365. It also gives Microsoft an overarching umbrella in the calendar app space because Sunrise works with Gmail accounts and Facebook events and birthdays.

It integrates well with a host of other apps from Google Maps to TripIt and it will fold well into Outlook, which was no doubt Microsoft's intention. This would not only make Outlook very relevant for business, but also ensure it's strong position among consumers. Throw in a desire to push ahead with inking capabilities (Microsoft bought N-trig, an Israeli provider of digital pens and chips for touchscreens last month) and it shows how the company is straddling the business-consumer line so well.

Microsoft Acquisitions

2014

PARATURE
Business type: Customer service software
Country: USA
Value: $100 million

GREENBUTTON
Business type: Cloud computing
Country: New Zealand
Value: Undisclosed

CAPPTAIN
Business type: Mobile application development
Country: France
Value: Undisclosed

SYNTAXTREE
Business type: Developer tools
Country: France
Value: Undisclosed

INMAGE
Business type: Disaster recovery solutions
Country: USA
Value: Undisclosed

MOJANG
Business type: Computer software
Country: Sweden
Value: $2.5 billion

AORATO
Business type: Enterprise Security & machine learning
Country: Isreal
Value: Undisclosed

ACOMPLI
Business type: Mobile Email Apps
Country: USA
Value: Undisclosed

HOCKEYAPP
Business type: Mobile Beta Distribution & Crash Analytics
Country: Germany
Value: Undisclosed

EQUIVIO
Business type: Text Analytics Service
Country: Israel
Value: Undisclosed

REVOLUTION ANALYTICS
Business type: Statistical computing and predictive analytics
Country: USA
Value: Undisclosed

SUNRISE (CALENDAR)
Business type: Calendar Applications
Country: USA
Value: $100 million

N-TRIG
Business type: Styli
Country: Isreal
Value: $200 million

2015

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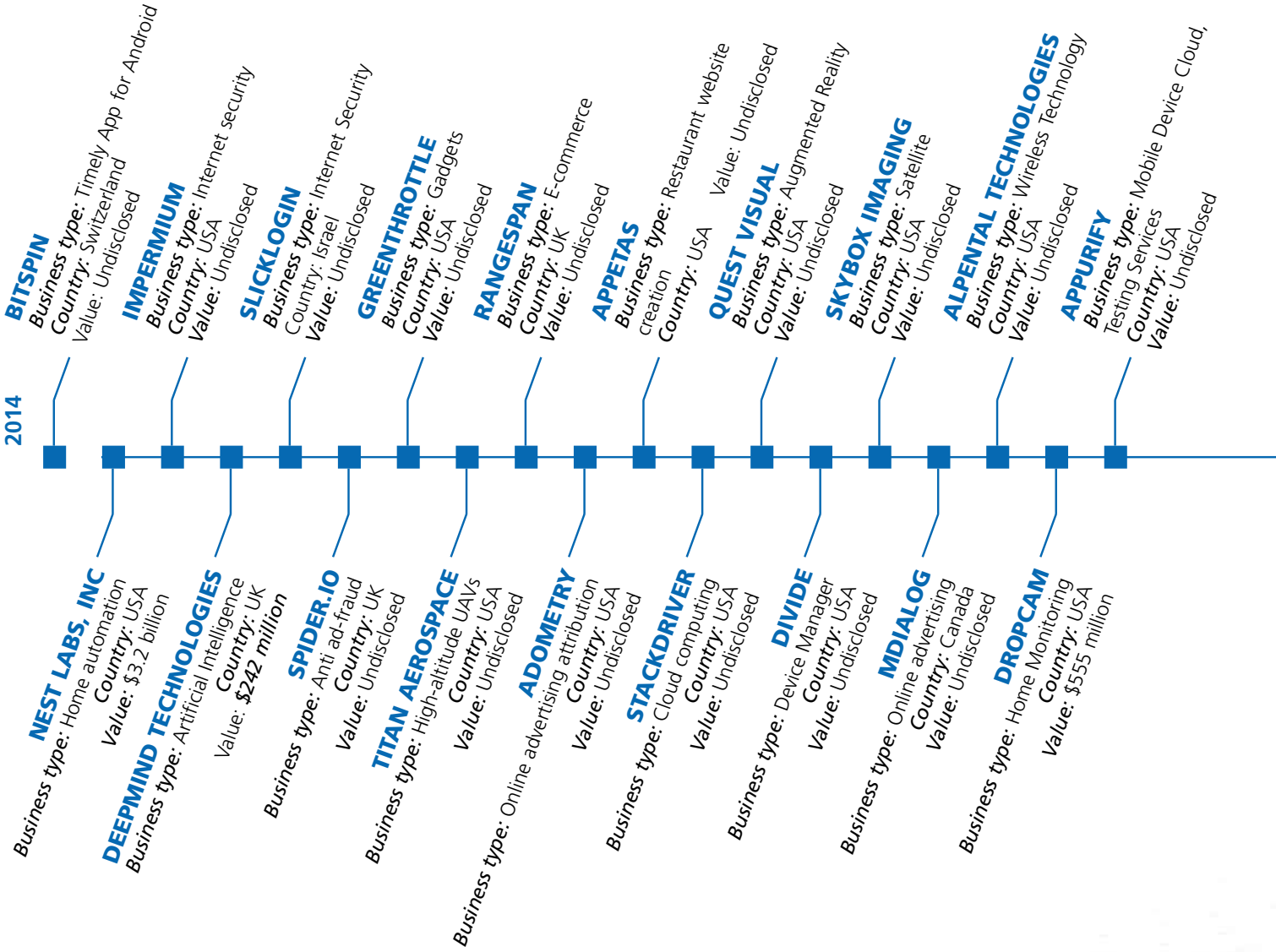
Google Acquisitions



Google's Purchases

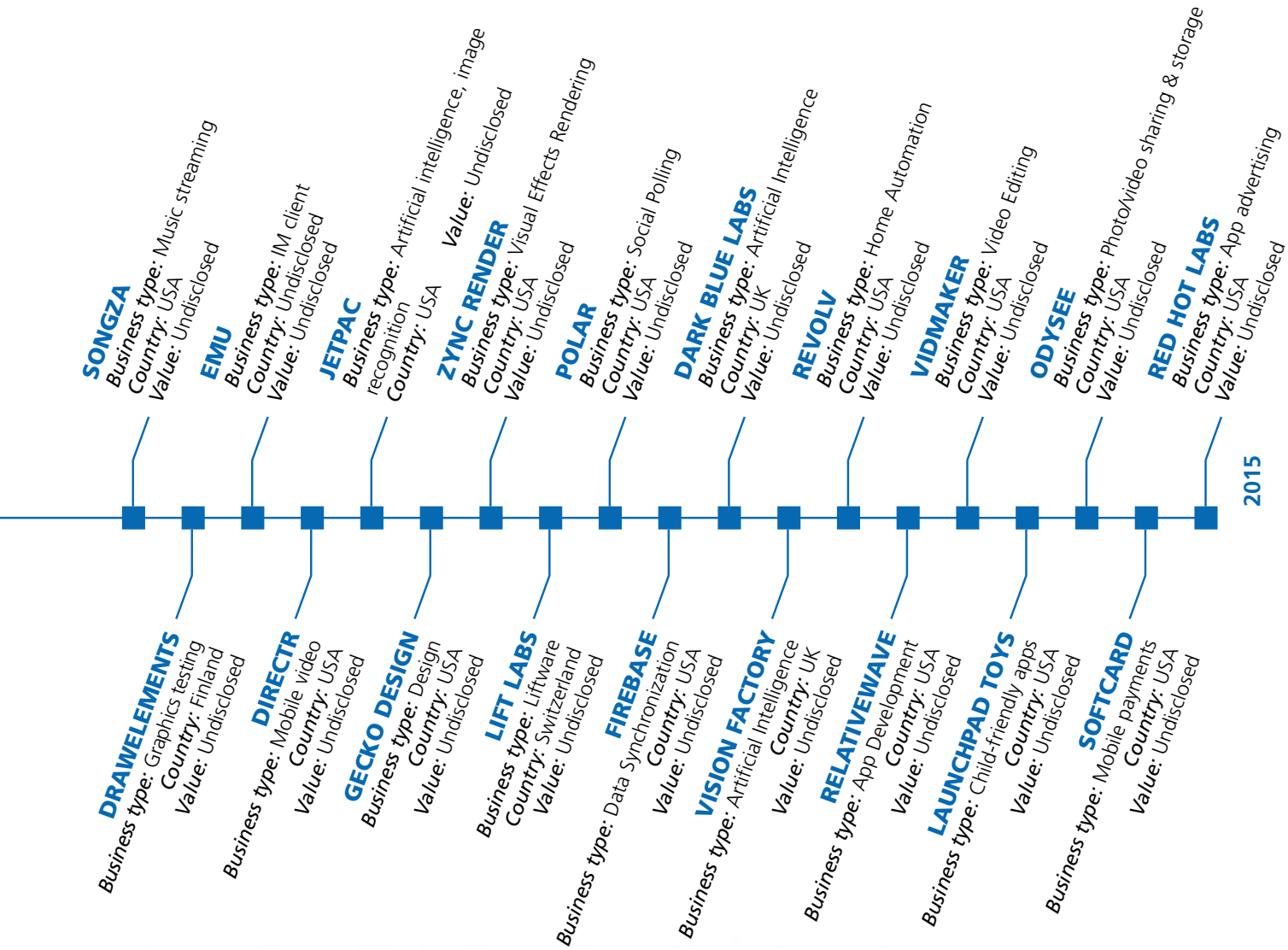
So what of those 38 acquisitions by Google? The last time we looked at Google's business activity in *Micro Mart* was in January 2014 when we noted some clear trends. We could see that Google's acquisitions were relating to services in which the company could make more money from its own existing services (it had bought SageTV for the benefit of GoogleTV) as well as new markets. One of these was the field of robotics – its Google X arm had snapped up Schaft.inc, Redwood Robotics, Meka Robotics, Holomni, Bot & Dolly and Boston Dynamics. It had also acquired Nest and it was positioning itself at the heart of the internet of things. "Google bought Nest in order to learn about this world where even more information is going to be accessible by computers," said Forrester Research analyst Frank Gillett.

The Nest deal was firmed up – at a cost of $3.2 billion – in January 2014 in what was a busy year for Google. It snapped up Revolv, a hub allowing people to control all of their smart devices from one app on their smartphone, and which is being integrated into Nest for greater compatibility between devices. It bought a few internet security firms – Impermium, SlickLogin and spider.io – and it became active in the Artificial Intelligence space with DeepMind Technologies, figuring it could use the technology within robotics and as part of the internet of things, thanks to AI's application in making computers think like humans.

Artificial Intelligence has been very important to Google's acquisitions. In the last six months, it has concluded deals for the UK-based companies, Dark Blue Labs and Vision Factory, which are being integrated into DeepMind. Both were spun-off from Oxford University start-ups and specialise in computer vision and the machine learning of natural language. They will help to bolster products that rely on understanding what humans are attempting to say, making voice searching more fluid.

As well as those two firms, Google bought a company called Jetpac that uses AI to create city guides using photographs taken by members of the public. Jetpac uses neural network and image recognition technology and it is able to work out which

MICROSOFT & GOOGLE ACQUISITIONS



places are the most popular and which are the most scenic. Bought so that it could be integrated into Google Maps, Jetpac is so advanced that it can even pick up on how much lipstick is on display on someone's face and the shape it is forming. If it appears to be on a smiling face, then Jetpac can gauge the happy mood being displayed in a photo.

Such innovations will position Google well in the lucrative advertising market, encouraging more people towards its services. Meanwhile, and leaving nothing to chance, the company has been ensuring it stays ahead of the field by buying ad-specific firms as wide-ranging as Adometry (which allows companies to see how well an online advert is influencing someone to click or buy an item),

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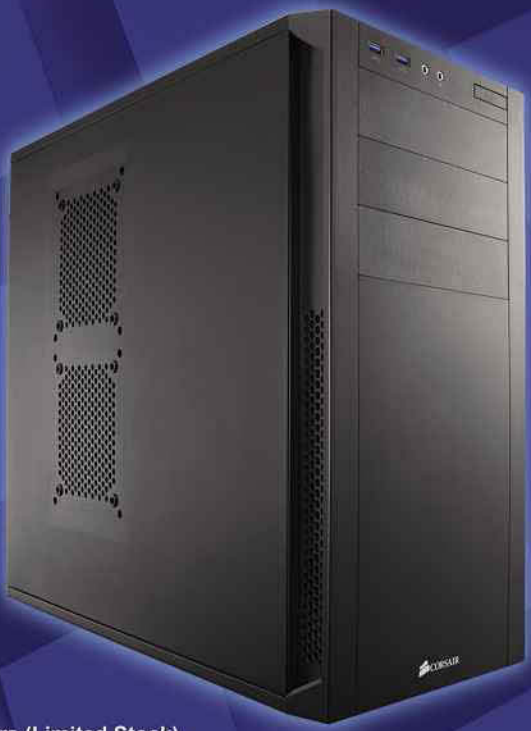

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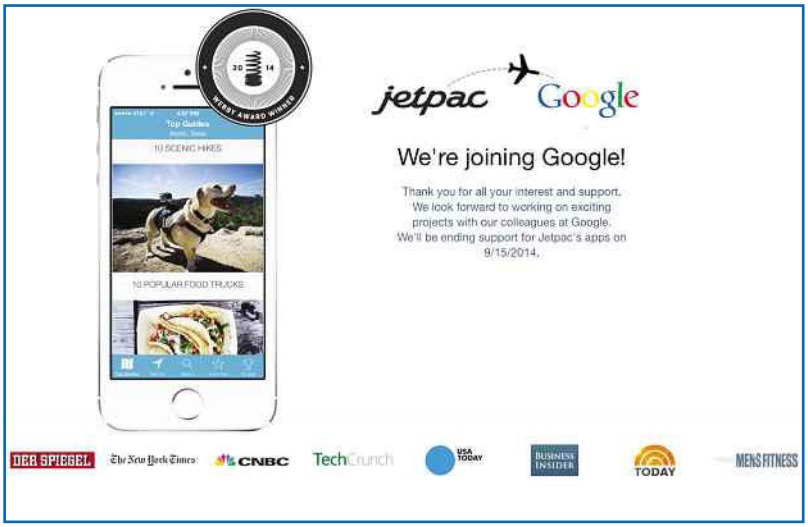

mDialog (a video advertising firm that was integrated into another Google acquisition, DoubleClick) and Red Hot Labs, which latterly became known as Toro and which helps developers to promote their apps on Facebook. This will help the search engine giant to cream off more money through Google Play purchases, it can be assumed.

Google+ Acquisitions

Whether or not it will use Toro to help people promote via Google+ is unknown at this stage, though (Red Hot Labs was only purchased last month), but it seems the social media site is here to stay for a while longer. Polar was bought last September to make Google+ more user-friendly on mobile devices according to David Besbris, Google's vice president of engineering, and it is set to make good use of its staff. Polar's core business asked simple, black-and-white poll questions such as 'Do you like apples or bananas?' but the team has enough social media awareness to make them a real asset for Google as it sticks with its plan to infiltrate the social media space.

Google+ has also benefited from the acquisition of Odysee, which it may well use to add more private sharing features. Odysee works by automatically backing up videos and photos from mobile devices to home computers while allowing for private, auto sharing. Google immediately pulled its app from the App Store and Google Play, leading to speculation that it was the features, rather than the app itself that it desired.

Indeed, the firm has been bolstering Google Cloud with lots of acquisitions. The cloud monitoring service, Stackdriver, delivers solid information about usage and it has been integrated into Google's offering. Appurify has enabled automatic testing and optimisation of websites and mobile apps for developers and has been a good fit alongside the Google Cloud Messaging and Android Studio development tools. Zync Render allows for visual effects to be rendered in the cloud and Firebase helps developers to build more effective real-time apps. The latter still appears to be a standalone service, however, with prices starting at $49-a-month.

Google seems keen to promote its consumer products for businesses, too. In buying Directr, a mobile video app that allows small firms to create and upload marketing videos, Google has been able to make use of what is now a free tool to bolster the presence of such companies in Maps and searches. Added to the collaborative video editing tool Vidmakeris, which Google has also acquired, it suddenly has facilities to allow companies (and creative groups) to bring multiple people together in the editing and sharing of videos in real time.

Google hasn't forgotten consumers in all of this, though. By purchasing the apps firm, Launchpad Toys, which develops TeleStories, a cool app that allows children to make their own TV shows, YouTube for Kids has become a reality (and it offers a load of children's favourites from the likes of DreamWorksTV and National Geographic Kids).

Is all of this a good thing, though? It would seem so. While some claim the swallowing up of companies by giants like Microsoft and Google leaves smaller firms are unable to grow and become direct competitors, the skills the individual companies and their staff bring to the table ensure that established core products become better and more widely used. The competitive element remains because new start-ups emerge with their own ideas, safe in the knowledge that, should their product or service be attractive enough, they can strike it rich. Their ideas then go into a larger melting pot but the money they have generated can, further down the line, be reinvested into new initiatives.

At the same time, ideas snapped up by one company deprive another but as long as technology is being used and remains part of every day life (and we cannot seem a time when it won't be), we'll undoubtably continue talking about such buy-ups. For the companies involved and the watching public, that can be very exciting indeed. **mm**

What Next?

It is never easy to forecast what big companies will snap up next, but with Google having just bought Softcard – the mobile payments app owned by Verizon, T-Mobile and AT&T – in a deal that allows Google Wallet to be pre-installed on Android devices, you can bet that more payment systems will be acquired in the coming months and years.

Microsoft, meanwhile, appears to be moving into app development, which we have seen with Outlook and Sunrise. More canny purchases that can be integrated into its business-focussed offerings are sure to follow and we can expect to see more cloud service firms also purchased as a result.

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Smart Appliances: Innovation Or Gimmick?

Are you ready to hook-up your house to the Internet of Things?

For many people it's almost impossible to remember what life was like before they had a powerful computer sitting in their pocket at all times. By providing instant access to email, maps, entertainment and applications, the smartphone has definitely replaced the bog-standard mobile in the popular imagination. Developments haven't stopped there, though.

The rise of the smartphone has been swiftly following by a raft of other smart devices: TVs, watches, and even cars are getting in on the act – making your old, non-smart versions look practically Victorian by comparison. There's more to come, as more and more devices become computerised and connected, though. This is the so-called 'Internet of Things' – non-standard devices taking on qualities and capabilities that were once only associated with desktop and mobile systems.

Of course, there's no official definition of what makes a device 'smart', but smart devices tend to share a few qualities.Inter-device connectivity is the big one; smart hardware can generally relay stats and information via Bluetooth or wi-fi, while at the same time accepting instructions so that you can control it remotely. The ability to access to web is also common, whether over a mobile connection or wireless signal, and on the most sophisticated devices you can install apps to extend the capabilities of the hardware.

Today, you'd expect to find these features in a smartphone, smart TV or Blu-ray player, but what other smart devices are there, and are genuinely they the future or just riding a wave of gimmickry? We looked into it.

Smarter iKettle/Coffee Machine

Whether you're a fan of the classic British cup of tea or a more European Coffee, Smarter has you covered, having produced the smart 'iKettle' and a wi-fi connected Coffee Machine.

The iKettle, which comes in a variety of colours, costs £100 and can be controlled directly from an Android or iOS phone. Activate it remotely when you wake up and receive notifications when it's ready to pour, the water needs refreshing or if it empties out. You can boil to any one of four temperatures depending on the type of tea you're brewing (the app will help you choose) and there's a 'keep warm' mode. All you need is a Wireless N or AC connection and a phone or tablet running at least Android 4 or iOS 7.

On the other side of the fence, Smarter's Coffee machine (which is due out in May) will cost £150 and have similar smart controls, including the ability to grind and brew beans on demand, brew anywhere between one and twelve cups, and adjust the strength depending on your preferences. Again, you get timer functionality and notifications, and the app is available for Android and iOS. It's even compatible with the online service IFTTT (If This Then That), so with a little tweaking you could set it up to brew your coffee automatically whenever you get close to home after work. If that's not the future, what is?

VERDICT:
INNOVATION

Samsung WF457 Washer & Dryer

Samsung were one of the first big manufacturers to incorporate smart functionality into its washing machines and tumble dryers, although only in the most high-end models. The feature is far from standard, but there is at least one product line that allows you to get technical about your washing, and that's the WF457, which contains one washer and one dryer, depending on your preference.

As well as having an 8" touchscreen to help you select programs, the appliances can connect with your smartphone so that you can receive a notification when your laundry is complete, or check what part of the wash cycle it's currently going through – the idea being that you don't have to run up and down stairs or between rooms just to check. Unfortunately you still have to load and unload the laundry yourself, so we're not quite in the brave new future yet. Soon, maybe?

While remote notification isn't necessarily the most useful feature (though it does mean an end to incessant beeping) the diagnostics the onboard computer can also supply is the really interesting thing. The app will give you an idea of how the machine is performing and when it needs a service or repair, as well as whether there are ways to make it more efficient. It's maybe not the coolest use of smart technology, but if you spend several hundred pounds on a washing machine at least it helps you protect that expense.

VERDICT:
INNOVATION

Hive Smart Thermostat

There are few things in most houses as difficult to master as the timer on a thermostat, so anything that makes the process of adjusting your heating simpler has to be a good thing. Smart heating systems such as Hive take that one step further, allowing you to adjust and administer your heating remotely as long as you have an internet connection available to you.

Costing just £199 (including installation) Hive allows you to control your heating from any internet-enabled device, so you can activate and deactivate it remotely depending on whether you're at home or not, or control the thermostat from your bed. The app helps you keep track of your expenditure so that you can minimise bills, and the greater, more intelligent control over your heating allows you to save even more money.

The success of Smart Thermostat systems is clear from the number of systems that have been put on the market. While Hive is one of the most popular (it's made by British Gas), alternatives include Google's Nest, Tado, Heat Genius, HeatMiser, Honeywell and more besides, all with their own features and software. Clearly, this is technology to look out for.

VERDICT:
INNOVATION

LG Internet Fridge

The internet fridge concept is perhaps the ultimate expression of, and the grim punchline to, the Internet of Things. In theory, it's an idea with purchase. In practise, it's a gimmick. The first internet fridge was manufactured in 2000 by LG, and was considered a failure, and yet the idea never goes away.

The theory goes that an internet fridge can keep track of your purchases, let you know when you're out of food you need, and warn you if food is going off. The reality is that you probably have to input the information yourself and can tell long before the fridge can if the milk needs replenishing. Although it's theorised that the internet fridge would one day order food for you before you even need it, they've never become that sophisticated – much to the delight of Tesco delivery drivers, we'd imagine, as they have so far avoided being asked to deliver a single pint of milk.

Nonetheless, LG has a new internet fridge. Part of its Smart ThinQ range, the LFX31995ST is a $3,000 investment with a built-in 8" touchscreen to help manage its contents, check expiration dates and match your ingredients with recipes. Fine temperature control, performance diagnostics and more advanced stats can all be accessed from the touchscreen or through the smartphone app.

So as long as you have an internet connection, you can have access to your fridge in every way other than physically. Useful on shopping trips, maybe not that useful if you need a snack.

VERDICT: Gimmick

Philips Hue Lightbulb

Coloured lighting might be a little bit Seventies, but you can bring the concept fully up to date by investing in a Hue lightbulb. Wirelessly controlled using software on your smartphone, this otherwise ordinary-looking bulb is capable of emitting light of any colour and brightness, leading to all sorts of practical applications.

In theory, you might set it to gently wake you up by gradually illuminating your room in the mornings. Or turn your lights on and off remotely while you're out of the house to deter burglars. You might illuminate the room before you enter, to save fumbling with a hard-to-find light switch. Or use one of the pre-existing 'light recipes' to set the ambiance of your room to a specific mood.

Let's face it, though: the real reason anyone might want to buy a Hue is because it's fun. As well as a timer, the software includes a 'colour-picker' that allows you to select a hue from any image you've taken and use it as the basis for your light colour. You can integrate with popular web-service IFTTT to create lighting that changes colour when you get an email, or tweet, or if someone uploads a photo of you on Facebook. The possibilities are near-endless.

Though compatible with multiple devices, Hue bulbs are only available from the Apple Store, where the starter pack of three bulbs and a wireless bridge costs £180, with additional bulbs available from £50 and up. So, er... better start saving for this one, then.

VERDICT: INNOVATION

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The Orange Chef Prep Pad

If you've ever wished that your kitchen scales could be less passive when you're trying to cook dinner, then we've some good news: The Orange Chef – the company that brought you the combination iPad Stand / Chopping Board and Chef Sleeve tablet covers to keep your screens clean – has also devised something called the Prep Pad. Which, as absurd as it sounds, can only be described as a set of Smart Kitchen Scales.

As well as using the Prep Pad to weigh food as you prepare it, you can use your tablet to retrieve detailed nutritional information based on food type and weight, with graphics showing things like calories, amount of carb/protein, and more. There are 250,000 food types supported and a database of barcodes so that you can directly scan the food (that's US-based, though, so it probably won't work in the UK).

It undoubtedly has high production values, with a body made of solid aluminium and a top made of an easily sanitised recycled paper-based material, and it's even simple to set up. One touch of a button allows you to pair it, over Bluetooth, with your phone or tablet and the associated 'Countertop' App. It's even compatible with some fitness trackers, so that you can log your meals even as you make them. All it needs is 4x AAA batteries, and it can be yours for just $110. They do ship to the UK, so if you really can't resist then you're in luck. Precise nutritional information can be yours.

VERDICT: Gimmick

August Smart Lock

You probably think that allowing your house to be unlocked using Bluetooth is asking for trouble, but August clearly don't agree with that assessment. The August Smart Lock is, according to its makers, a simple, secure, and 'social' (we'll explain that in a second) way to manage your home's lock without requiring a set of keys.

Technically speaking, security isn't much of a concern. The encrypted connection, in real terms, is no less secure than a standard lock, and has the added benefit of allowing you to place time restrictions on access to your home. The 'social' function of this gadget means you can issue 'keys' to your friends, who can then enter your home using just their phone (as long as it's within the limits you've specified). As well as this, you can see a log of who's entered and when, meaning there's no way for someone to sneak in without you realising.

Other features include 'Auto Unlock' (which opens your door as you get near), 'Everlock' (which automatically locks the door every time it's closed) and a virtual guestbook people can sign when they use their 'keys'. The system is powered by 4x AA batteries, which ensure it stays working even in a power cut, and it doesn't require a wi-fi connection to work. When the battery runs low you'll get a reminder to change them well before it becomes a problem.

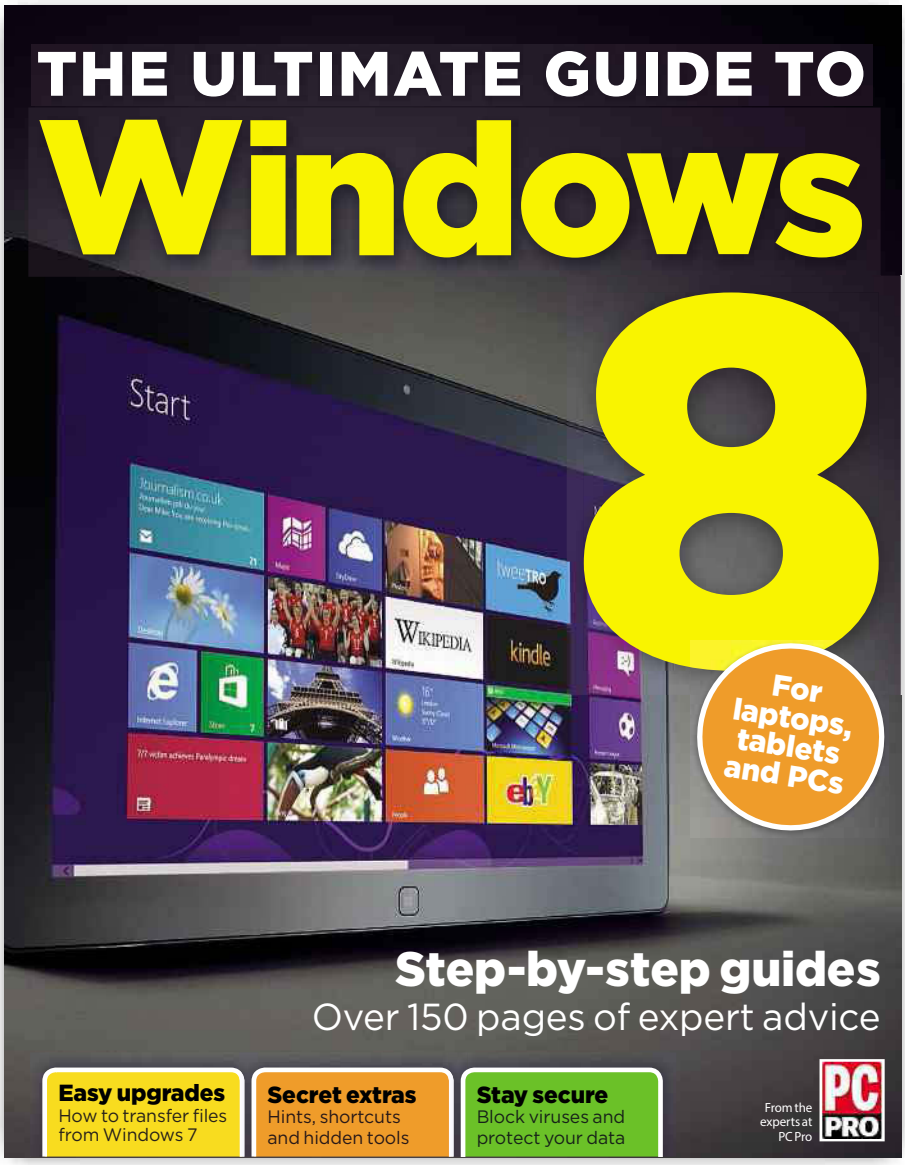
Of course, while all of that sounds like it might be fun and futuristic, we've just got one question: what do you do if your phone's battery runs out when you're outdoors? For $199, you'll be able to get your own Smart Lock and find out.

VERDICT: INNOVATION

It remains to be seen whether this 'Internet of Things' is going to cause a lasting change in the way home appliances are made and how we use them, but it's clear from the range of items already on the market that manufacturers, at least, are keen on the idea. Although that doesn't always work out, there's a chance – a strong one, at that – that connected home appliances are the future, even if it isn't necessarily in the form of internet Fridges and Bluetooth chopping boards. **mm**

Everything you'll ever need to know about **Windows 8**

MAGBOOK



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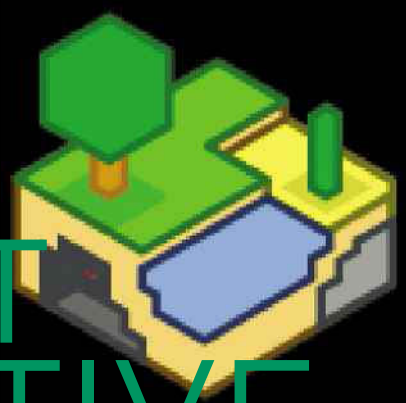
MINETEST: AN OPEN SOURCE MINECRAFT ALTERNATIVE



David Briddock compares this free block-based sandbox with its more famous Microsoft-owned rival

Microsoft's recent $2.5 billion acquisition of Mojang, the company behind Minecraft, resulted in an outpouring of dismay, uncertainty and confusion within the huge and fiercely loyal Minecraft community.

To allay fears, Microsoft released statements saying its intention is to keep Minecraft just as it is. After all, it says, doing anything that upsets the Minecraft community would be foolish – not to mention a huge waste of money. However, as 2015 begins to unfold, Microsoft's long-term plans for Minecraft are still unclear.

Holographic Attractions

There's certainly a concerted effort to position the Minecraft game in such a way as to draw people to the forthcoming Windows 10 platform, but also to attract developers, from novice and experienced, to Microsoft's development toolset.

The holographic HobLens and Holo Studio announcements made on 21st January help enormously in this regard. Yet despite the possibility of a future holographic version, the Minecraft community is rattled.

Many are willing to explore other options, such as an 'indie' and open-source alternative. Which brings us to the Minetest project.

The Minetest Alternative

At first glance, Minetest looks to be a realistic alternative.

It has the same infinite-world sandbox-style concept, a strikingly familiar look and feel (as seen at **minetest.net/screenshots**), the same constructional exploration gameplay scenario, multiplayer server mode, and a similar range of game modification and customisation options.

So let's dig a little deeper and see if Minetest really would satisfy a Minecraft gamer.

Platform Choice

Probably the biggest difference, and one of the most attractive, is that Minetest is fully open source. This means its licence (LGPL 2.1) gives anyone the freedom to own, distribute and modify Minetest. This type of freedom typically results in wide platform availability, and Minetest is no exception.

Minetest downloads are available for Microsoft Windows (XP/Vista/7/8 in 32-bit/64-bit format), Apple Mac OS X, various flavours of Linux (Ubuntu, Mint, Debian, Fedora, Puppy and others) plus FreeBSD. Android is also supported with package downloads for both AMD and Intel x86 chip-based devices.

Importantly, Minetest is a lightweight application, which runs on fairly old PC desktops or laptops, such as machines running Intel 945GM graphics. However, a dual-core CPU is highly recommended for smoother gameplay.

Of course, as it's open source, anyone can download the Minetest code and port it to another platform. For example, some enterprising hackers are currently working on a Raspberry Pi port.

Basic Game Play

As you might expect, Minetest single-player mode is all about getting your on-screen character to explore, dig,

construct and terraform – all while surviving the dark nights and those hostile mobiles (or mobs).

However, just like Minecraft, there's much more to Minetest gameplay, including crafting items, smelting new materials and applying non-default texture packs.

Crafting is the art of fabricating objects and tools from resources like trees and various types of ore. Things like sticks for a pickaxe, planks for house building, coal for torches and so on. A pickaxe is a particularly important tool, as it helps mine stone and ores.

One of the more important crafting activities is to construct a furnace (built using cobblestone). Once you've built a furnace, you can start smelting, namely using various fuel resources to heat up and transform one material into another. There are many smelting recipes on the online wiki help pages, such as converting flour to bread, clay to bricks and sand to glass.

A texture pack alters the texture of blocks, items, mobs and the graphical user interface. It's essentially a collection of files, which can be downloaded from various online sites and then added using the appropriate Minetest menu option. Due to the game's blocky nature, these custom Minetest textures are composed from 16x16 pixel squares.

Subgames

Many players will be quite happy to stick to the out-of-the-box gameplay. Yet it's possible to create different styles of Minetest gameplay though a feature called subgames.

A subgame defines a foundation for a particular style of gameplay, and each one can have its own set of objectives. For example, survival challenges, building projects or competitive player versus player scenarios.

The official website lists some of the more popular Minetest subgames. These include Dreambuilder (a building based game crammed with building materials), Carbone (with a focus on fun and intuitive gameplay) and Big Freaking Dig (mine and extract multiple ores, create new tools and battle mobs).

But there are many more subgames to discover and explore. Just point your browser at the various Minetest forums (see Minetest Links boxout).

Mods

User designed and coded modifications, called mods, are a big deal in Minecraft. Mods can offer players a wider choice of types of bricks, items and tools plus additional game characters, animals and other mobs. The result is enhanced gameplay. Therefore it's no great surprise to discover Minetest has its own modding capability.

Popular Minetest mods provide new types of ores and blocks (including the Minecraft-Redstone-like Mesecons), passive or hostile mobs, plant life, carts that run on rail tracks, decor for your house and Minetest world editors. You might not find an exact duplicate of your favourite Minecraft mod, but as many mod inspirations come from the Minecraft community, you never know.

Servers

Minetest doesn't just offer a single-player option. It also supports multiplayer scenarios with its server mode. In server mode, you connect to a Minetest server, hosted on a local machine or over the internet, and join in a live game with players from around the world.

Each server will have its own gameplay flavour, as defined by textures, subgames, mods and mobs. There's an ever growing list on the Minetest web pages and forums.

Once again, this is a close replica of Minecraft's multiplayer capability, but with such a large, active community there are far more operational Minecraft servers, many more online players and a larger diversity of game-enhancing mods.

However, to rebalance the odds a little, you could always build your own Minetest server and invite the community to play, as we'll see later.

Texture Packs Creation

Would you like to create your own custom texture pack? To start, edit the default texture files. You can use just about any image

editor, as long as it's able to save the image as a PNG file and supports transparency (also called an 'alpha' layer). The free and open source GIMP application is a popular choice, but select the one that suits you best.

In theory, textures can be any size. However, square images with sizes like 16x16, 32x32, 64x64, 128x128 and so on are likely to work best in this blocky world.

When you're done editing, put the amended files in a new texture pack folder. This folder is then compressed into a zip archive, which can be uploaded to the internet for others to use, along with a suitable announcement post in the Texture Packs forum.

Build Your Own Server

As we mentioned above, Minetest supports multiplayer servers, but maybe you just can't find the sort of gameplay option you and your friends are after. Or maybe you've seen (or coded) a cool Minetest mod that you'd like to use and share with others.

Well, you can. Just like Minecraft anyone can build their very own Minetest server, with a bespoke collection of textures, mobs and mods – a server to host games between family members and friends or an internet-connected server for the whole Minetest community.

The steps are fully documented and relatively straightforward (see Minetest Links boxout), and anyone who's already built a Minecraft server will find the whole process very familiar.

Build Your Own Mods

As we've seen, Minetest has a modding capability and community, just like Minecraft. However, modders are offered greater flexibility with Minetest.

With Minecraft, modders have to use the Java development language, the language used to code Minecraft game, but with Minetest, modders have a choice between the powerful C++ language or the user-friendly Lua scripting language.

Using C++ gives the ultimate control, as all the core source code is written in C++, so you can literally do anything you like. However, C++ does take a while to learn, and the resulting code listings are typically pretty long and quite complex in nature.

Lua, on the other hand, is a more approachable, easy-to-learn scripting language. In many respects, Lua is rather similar to Python.

What we have with Lua is something similar to the Minecraft for Raspberry Pi scenario, with its Mojang-provided Python hacking module. However, Minecraft for Raspberry Pi is a one-off, cut-down and severely limited implementation of the full game.

In contrast, with Minetest you can create Lua-script mods on the complete and unrestricted game. In fact, by default, Minetest has a generic collection of Lua mod plug-ins contained in a set called 'minetest_game'.

Of course, Microsoft's acquisition could radically change the Minecraft modding picture. The .NET development framework offers an advanced set of tools and, more importantly, a wide choice of coding languages.

Still, until we hear more from Microsoft about its Minecraft-specific plans, Minetest can claim it offers the coding community more flexibility.

Minetest Links

- Screenshots: minetest.net/screenshots
- Basics: wiki.minetest.net/How_to_build_your_first_house
- Blocks: wiki.minetest.net/Blocks
- Items: wiki.minetest.net/Items
- Crafting: wiki.minetest.net/Crafting
- Smelting: wiki.minetest.net/Smelting
- Mobs: wiki.minetest.net/Mobs
- Texture packs: wiki.minetest.net/Texture_Packs
- Servers: minetest.net/servers
- Mods: wiki.minetest.net/Mods
- Sever hosting: wiki.minetest.net/Setting_up_a_server
- Texture pack creation: wiki.minetest.net/Texture_Packs#Texture_Pack_Creation
- Mod creation: dev.minetest.net/Main_Page
- Source code: github.com/minetest/minetest/blob/master/README.txt
- Discussion board: forum.minetest.net
- IRC channels: minetest.net/irc
- Reddit forum: reddit.com/r/Minetest

Community

As you might have guessed, Minetest can't begin to compete with Minecraft's huge, intensely loyal, highly active community, which reaches every corner of the globe, and after spending so much cash, Microsoft sincerely hopes this will always be the case. Yet the Minetest community is growing all the time, and there are a number of ways to become involved.

For example, you can visit one of the many forums on the official Minetest discussion board (**forum.minetest.net**) or the Reddit forum pages (**reddit.com/r/Minetest**) or chat on one of the IRC channels (**minetest.net/irc**).

If you're interested in the development side of things, you can browse, download and code-share on the Minetest project's GitHub code repository pages (**github.com/minetest**) or interact via the dedicated development pages (**minetest.net/development**). mm

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Component Watch

Component Watch

Looking for a bargain external drive? Here are five that will do the trick

SSD drives might be fast becoming the go-to storage medium for desktop systems, but when you need lots of storage you still can't beat a mechanical drive. Luckily, external versions of this older technology seem to be getting cheaper by the day, and are packing in more storage than ever. Thus, If you're in the market for a new external hard drive, but don't want to spend a lot of money, then it's good news: this week's component watch is all about sub-£100 models that offer a very handy terabyte of space.

Deal 1: HGST Touro Mobile MX3 1TB
RRP: £50 / Deal Price: £40

The HGST Mobile MX3 provides 1TB of portable storage for an incredibly reasonable price. It's certainly enough to store most people's collections of photos, music and documents (and some movies too) – and it comes packaged in a secure and stylish enclosure. Plug-and-play simplicity twinned with USB 3.0 support means it's both easy and fast to use, and that there's no need for a separate power supply. The two-year warranty thrown into the bargain only sweetens the deal, so if you're not into comparing stats and just want an easy option, this is probably it.
Where to get it: Pixmania (**bit.ly/1nNppY9**)

Deal 2: Verbatim Store 'n' Go 1TB
RRP: £65 / Deal Price: £47

For those who are concerned with such things, the Verbatim Store 'n' Go is available in colours to suit any taste (including bad) – bright orange and metallic pink among them. Luckily, for those that aren't so bothered with sartorial matters, it's also a pretty good hard drive. Simply designed and simple to use, with a single USB 3.0 port that both powers the unit and transfers data, it's one of the lightest drives we've seen. While that may seem as niche a concern as colour coordination, it's a definite boon if you're planning to use it on the move. An interesting extra is the energy-saving 'green button', which quickly powers down the drive when it's idling. Not bad.
Where to get it: CCL Online (**bit.ly/1lNDgLr**)

Deal 3: Samsung M3 1TB
RRP: £57 / Deal Price: £48

Available in a variety of sizes, the Samsung M3 drives are excellent quality with a robust casing and stylish design. The 1TB is the best value of the lot at just £50 but, as external drives go, it's about as basic as the HGST Touro – the only feature is a USB cable to connect it to your system. It is USB 3.0, though, which means you get some super-fast transfer speeds when reading and writing to the drive, but other than that it's as plain as they get. Lucky it's so good at what it does, really.
Where to get it: Pixmania (**bit.ly/1DEuk3Z**)

Deal 4: Seagate Backup Plus 1TB
RRP: £70 / Deal Price: £50

Seagate has strong credentials in the hard drive world, and this drive shows why. Available in four colours, the unit is under 50 long, and weighs only 225g. Seagate's proprietary 'USM' module means that the same drive can be connected to USB 3.0, Thunderbolt and FireWire connectors if you buy additional adaptors, although it comes with USB 3.0 as standard!
Where to get it: Maplin (**bit.ly/1EJrdfm**)

Deal 5: Western Digital My Passport Slim 1TB
RRP: £78.50 / Deal Price: £55

There are plenty of decent, cheap external hard drives around, but few are specifically for portable use. The Western Digital My Passport Slim is, though. A USB-powered USB 3.0 device capable of storing 1TB, it has an ultra-thin form factor that allows it to be carried around with greater ease than most devices in its class. There's even a pouch included so that you don't scratch the case!
Where to get it: John Lewis (**bit.ly/1F4TMSu**)

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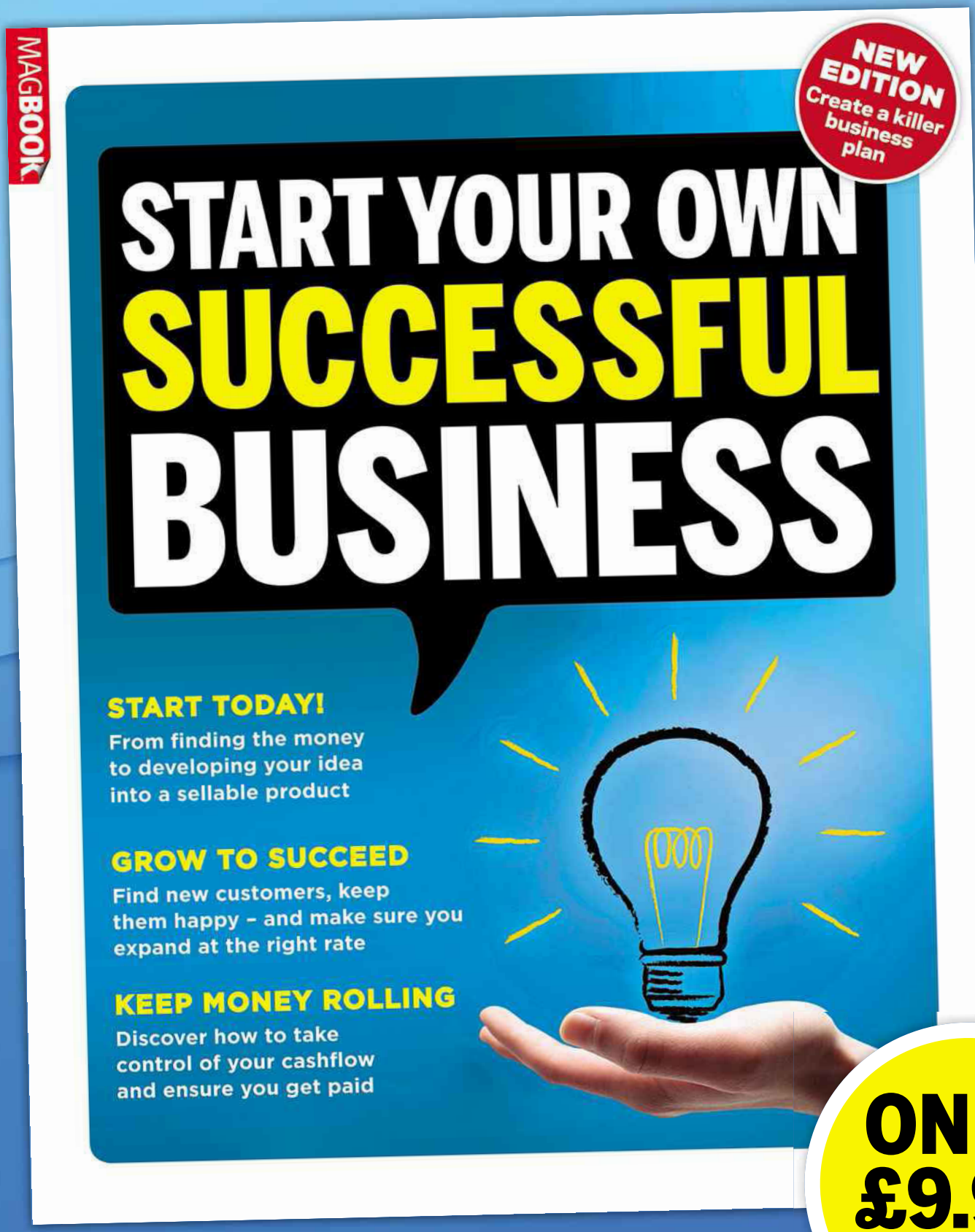

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5G Is A Record-Breaker

University researchers achieve 1 Tbps

Samsung Lifts Veil Off Galaxy S Smartphones

Curved face at heart of firm's plans

Samsung has revealed the latest in its Galaxy S range, and it's all about the curves.

Probably the most significant feature of the S6 Edge, arguably the biggest release yet for Samsung, is the fact that its edges are beautifully curved. Hailed in some circles as Samsung's finest-looking smartphone yet, this will be an important launch given the relative failure of the S5 to set any hearts racing.

Showcased at the Mobile World Congress show in Barcelona, the S6 Edge sat proudly alongside the non-curved S6, and Samsung is hoping that these are successful in its long-standing battle against Apple. As for other key features, the mobiles are powered by Samsung's 64-bit, 14-nm Exynos processors, batteries cannot be replaced, and wireless charging is included to allow for powering up without a dedicated Samsung accessory.

Just take one more look at that curved look, though. It is very, very tempting...

HTC Working On Half-life VR Title?

BBC reports on possible collaboration

Ah, we love the Mobile World Congress. As trade shows go, there is always something to talk about, and 2015's event has been no exception.

One of the more interesting stories has been HTC's teaming up with Valve in its development of a virtual reality headset of its own. The HTC Vive is planning on taking on the likes of the Oculus Rift, and a public version of the product is due for sale later this year.

Powered by SteamVR, HTC's vision for the headset is rather grand. "Imagine standing on the bridge of a starship rocketing across the galaxy, or strolling through the streets of ancient Rome, or shrinking down to subatomic size and watching molecules collide" goes the blurb on the **htcvr.com** website, accompanied by some lovely, sweeping video imagery. To achieve this visionary perspective on gaming, the Vive headset will place a 1200 x 1080 pixel screen in front of each eye, complete with a 90fps refresh rate. Gyrosensors, accelerometers and laser position sensors track your movement, and ergonomic game controllers in each hand will allow you to interact with your virtual world.

Clearly this is all a bit exciting, more-so when HTC's chairwoman told Auntie Beeb that she hoped a *Half-life* title would be released for the headset and that the company was co-operating with *Half-life* to make it happen. The BBC also reported that software developers at Valve denied working on any such game, so confusion abound on this one. Whatever the situation with *Half-life*, this headset is very much a reality.

QUICK BITS... The desktop and mobile versions of the Windows 10 Technical Previews have been signed up to by more than

Some researchers working at the University of Surrey's 5G Innovation Centre have broken data connection records by reaching speeds of 1Tbps.

To put that into some perspective, that's over 65,000 times faster than average download speeds for 4G networks. Equally exciting is that the 5GIC boss is hoping for a live public demo in 2018. Ofcom wants 5G to be viable for Britons by 2020, and this is clearly a step in the right direction.

Prior to this, the quickest speeds under test was Samsung's 7.5Gbps. A heck of a big step forward, then.

VR Headset For Not Much Money

Sub-£30 glasses to take you into virtual worlds

You've quite possibly bought something from the Firebox.com site in the past. The gadget website has quite the paraphernalia of gifts galore – some good, some not so good – and it's now added a virtual reality headset to the mix.

The Immerse Virtual Reality Headset lets you watch 3D movies, play simulated games and take a whirl in virtual simulations with free content that's available directly for smartphones from the App Store and Google Play. The £29.99 wireless headset comes with 360-degree head tracking, an Ultra Wide Field Vision, plus contact foam and adjustable head straps for better comfort.

There's no getting around it: they look ridiculous. In the comfort of your own home, you'll be quite happy to wear them, but on the train? Doubtful.

Remember the BBC technology show *Tomorrow's World*? I have fond memories of watching it as a child, awestruck by the amazing advances engineers and inventors were making in the sciences. It helped kindle in me a strong, lasting love of technology – part of why I've embraced smartphones and tablets.

As much as I enjoy smart devices, I do wonder if we're taking things beyond their logical conclusion. Smartwatches, which seem like a good idea on paper, are already struggling to gain any real interest. So why would anyone want a smart kettle? Or a smart fridge?

Are these things really improved by giving them internet connectivity? And does this logic apply to everything? Personally, when I'm having my lunch, I don't think, "This sandwich is okay, but it'd be better with cheese. Oh, and a broadband line."

I'm not convinced just yet, I'm afraid. That said, though, let it be known that the internet sandwich was my idea, just in case.

Anthony

Editor

2.8m people, says Microsoft

Meanwhile... On The Internet...

Keen readers of *Micro Mart* may remember that, at the start of the year, James Hunt made the case that Google+ was not the failure that many perceived it to be, and that it had actually done the job it was supposed to do. If you don't remember, you can read the article at **tinyurl.com/MotI1353a** – and then you can look upon reporting of Google's proposed changes to its oft-less-than-vibrant social network as something of a vindication of his theory.

It appears that Google plans to split up the features of Google+ and dedicate its time to optimising Streams and Hangouts, rather than trying to roll everything into one platform and compete with the combined might of Facebook and Twitter but rather accept that the market has fractured into services, and there will never be just one stream to rule them all (**tinyurl.com/MotI1353b**).

It has its little +1 buttons everywhere, so it seems like it's "Mission accomplished, let's get back to work", eh?

The trend for finding worrying weaknesses in internet systems thought to be secure continues apparently unabated. Last week we had the discovery of FREAK (Factoring attack on RSA-EXPORT Keys), which exploits the use of weak keys in SSL to allow man-in-the-middle attacks to scoop up info or spoof secure sites (**tinyurl.com/MotI1353c**), a worrying vulnerability that potentially effected pretty much everyone.

It's explained in some details at **tinyurl.com/MotI1353d**, if you have the stomach, but expect updates and patches imminently. If you're wise, you'll get up to date.

Aaaaaaaand Finally...

Yeah, so the whole llama thing got replaced by the whole weasel/woodpecker thing **(tinyurl.com/MotI1353e**), which was inspired by a snap by wildlife photographer Martin Le-May (**tinyurl.com/MotI1353f**) but sort of ended up feeding into the whole we-can't-stop-Photoshopping-Kim-Jong-un-into-stuff thing that's seemingly been going on for ages (**tinyurl.com/MotI1353g**) and we all laughed. Again.

Then there was that thing where Vince Vaughn promoted his new movie by producing a load of stock images that parodied the ones you see in the very worst PowerPoints and the occasional *Micro Mart* caption competition (**tinyurl.com/MotI1353h**). That was great.

After we made a point last week of justifying why our reporting of the net neutrality debate in the US was relevant to a UK-based magazine, it would be a little ironic not to report on movements happening in the European Union that cover much the same ground. Last week, ministers charged with looking after telecommunications within EU member countries came to agreement on the matter, but it was one that seemed to please neither the industry nor activists. That's democracy for you, we suppose (**tinyurl.com/MotI1353i**).

Depending on which side of the ideological fence you fall, this 'Telecoms package' either ensures "that companies that provide internet access treat traffic in a non-discriminatory manner" (the words of the official statement) or leaves wiggle room for telecoms companies to set up a so-called 'two-speed' internet further down the line.

If implemented (which would be on June 30th 2016, should it be ratified by the parliaments of EU members), it will ban outright blocking or slowing down of specific content or applications, and set rules on the management of traffic. It does, however, provide provision for so-called "specialised services", a term vague enough to have some people worried.

Quoted by *The Register*, Marietje Schaake of the Netherlands' Democraten 66 party, said the proposals were "disappointing to the point of insulting", that the council's wording was "vague", and that "We need clear principles and definitions. These are not in the council text, and I don't think that's an accident." Ultimately, she thought the proposals would struggle to find approval all across the Union.

The European Telecommunications Network Operators' association was also less-than-pleased, noting that while it was "in favour of an open internet and supports a harmonised, principle-based approach", "Any future regulation must recognise how networks function: We need balanced rules on traffic management as well as measures that allow the development of specialised services and innovative offers."

That's a stance that mirrors the controversy building around Netflix, which seems to want to support net neutrality as long as it's allowed to do deals when it suits. (**tinyurl.com/MotI1353j**). Unfortunately, it seems that net neutrality is an all-or-nothing thing, though. You've got it or you haven't.

.AVWhy?

We're sometimes wonder if YouTube runs on musical parody, but – even by its high (low?) standards – there seemed to be a lot of it to get through last week. While we do want to point you in the general direction of a natty little Taylor Swift parody (**tinyurl.com/MotI1353k**) that riffs on the internet fandom surrounding *Game Of Thrones*, we don't think it's lyrically strong enough to a) match the tremendous production values of the video (nice work **www.nerdist.com**, Freddy Scott, Andrew Bowser and Ben Mekler) or b) take the prize as the best sing-a-long-a-meme this week.

No, that would have to go to vocal gymnast and YouTube celeb Mikey Bolts (**tinyurl.com/MotI1353l**), who's made a

name for himself performing pop hits of the day using the voices of Peter and Stewie Griffin – and a host of other popular US cartoon characters. This *Uptown Funk* cover (**tinyurl.com/MotI1353m**) doesn't deviate wildly from that MO, but it's certainly funny. What's more, you'll never hear that *Uptown Funk* riff again with Peter G singing along in the back of your head. You're welcome.

QUICK BITS... PandaLabs detected and neutralised 75 million malware samples in 2014, more than double the number in 2013

Caption Competition

Sadly, it's too late for us to do a Happy New Ear joke, so let's just get on with this week's captions:

- "An ear-ly adopter of a new battery-free hearing aid was soon to realise her big mistake." **– Pete Heaven**
- "I'm all ears." **– Geoff**
- "Darwins theory of ear-volution is real." **– Thomas Turnbull**
- "NHS's new treatment to save on the cost of hearing aids is here." **– Thomas Turnbull**
- "A common problem with some Print It Yourself Implants was the mis-conversion between Imperial and Metric scaling in some popular software packages" **– Geoff Clarke**
- "Sally's tribute to Leonard McCoy had just one flaw..." **– Sean McDougall**
- "I was given some Monster Earphones for Christmas, so I got these to match." **– JayCeeDee**
- "Just because I can hear a pin drop at 100 feet, there's no need to call me an old bat!" **– JayCeeDee**
- "Ear, Ear, I 'll second that!" **– wyliecoyoteuk**
- "'Go on', said Alice. 'I'm all ears'" **– wyliecoyoteuk**
- "Redmond executives' publicity shot – we are listening but we will still do as we please." **– doctoryorkie**
- "I had plastic surgery in memory of the giant African elephant." **– ...JB**
- "The new wi-fi range extenders were not as unobtrusive as she would have liked." **– idunno**

And this week's winner is doctoryorkie, with "That new intern has big... oh she heard me."

To enter this week, head to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) and say something funny (but not too rude) about the picture below or email us via **caption@micromart.co.uk**.

Google Computer Wins Videogames

AI takes another leap

With fond memories of playing on the Atari always fresh in our minds, it comes as quite exciting news that a machine put together by researchers at Google has taught itself to play, and win, a bunch of classic Atari games.

Bods stationed at the Google DeepMind project have said in the *Nature* journal that this is the first time that a computer program had taught itself how to master a range of complex tasks. That's significant in the sense that Google is among several companies investing big in machine learning, having laid out £400m for UK-based DeepMind Technologies last year.

For this particular test, DeepMind was provided with the basic data in order to play videogames, including *Pong* and *Space Invaders*, and it succeeded in learning how to win the games put before it. Hardly Deep Thought level of AI, then, but significant enough for all those involved.

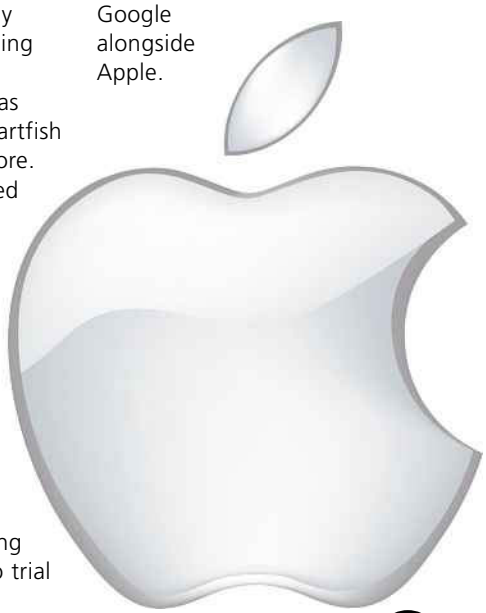
Patent Defeat For Apple

Over $500m called for in payout

Apple has been told to pay $533m to technology patent licensing firm Smartfish.

As big as an amount as that undoubtedly is, Smartfish actually wanted even more. However, it's been quoted as being "happy" with the case result. For its part, Apple is going to appeal the verdict.

Patent trolls have become a sad fact of legal cases in the tech industry, and this win, should it be held up, could prove significant, not least for Smartfish itself, which isn't stopping here, as it's due to go to trial against Samsung, having already sued Amazon and Google alongside Apple.



QUICK BITS... **The Apple Watch will be released in Europe and the US in April**

Snippets!

Bill Gates Is Still Considerably Richer Than You

Here's a surprise. Bill Gates has been named as the world's richest man for the 16th time, no less, by Forbes magazine.

Its annual ranking of global billionaires is a relatively big deal, and its latest list suggests that Gates' net worth is now valued at around $79bn. Wowsers.

There are 1,826 billionaires in the world, don't you know, and Bill is in good company, with Warren Buffet and Larry Ellison also included in the top ten.

WHO: Listen To Music For Less Than An Hour A Day

Listen up, audiophiles. It turns out that listening to music for more than an hour a day might be bad for you.

Yes, the World Health Organisation has warned that over a billion teenagers and young adults are risking permanently damaging their hearing by listening to too much loud music and that half of people in the 12-35 age group are exposed to unsafe sound levels from personal audio devices.

Ironic that the WHO should tell us how loud we should be allowed to listen to albums by The Who, no?

New Chinese Character Shared On Weibo

Over to the Far East now and it would seem that a new Chinese word, which doesn't exist in the dictionary, has been doing the rounds on Weibo.

By doing the rounds, we mean that the 'duang' character has appeared over eight million times on the micro-blogging website, with a hashtag that was doing some great trending business. Also popular on search engine Baidu, this is all rather odd.

It has apparently stemmed from a shampoo advert starring Jackie Chan. And that seems like a perfectly odd place to finish the Snippets!

Lenovo Apologises For Superfish... Again

Six-month subscription of McAfee LiveSafe offered

Lenovo's lengthy apology for the Superfish scandal continues further as the firm has announced that it's offering all Lenovo PC users affected by Superfish a free six-month subscription to McAfee LiveSafe.

Existing subscribers to the security product get an additional six-months for free, and this is of course on top of Lenovo's release of various anti-virus tools to take the software off your system. Lenovo wants to be "the leader in providing cleaner, safer PCs" and it's working towards this goal with a promise to launch standard images of Windows 10 products that will only include the OS, related software. and absolutely nothing else. This should, states Lenovo, "eliminate" adware and bloatware. We hope so.

Superfish was a big, big issue, for Lenovo – in some ways to its credit – has, at least, addressed it fully now. Maybe that's that, then.

TalkTalk Customers' Details Stolen

Scammers looking to nab bank details

If you're a TalkTalk customer, y,ou should have received an email from the company explaining that hackers have stolen account numbers and names from its systems.

The hackers are using that stolen data to try to scam customers into handing over their banking details, and a few thousand accounts were affected by the hack. Even so, TalkTalk took the decision to email every single customer, and it has also noted that it doesn't think any particularly sensitive data or payment data went missing.

How did TalkTalk find out about the breach? Well, it suspected foul play following a spate of customer complaints over scamming phone calls at the back end of last year.

QUICK BITS... The top 100 YouTube channels have increased their monthly views by more than double over

Tinder Charges Older Users

Dating app throws in premium features, at a price

Dating app Tinder has finally got round to announcing premium features, but it's going to charge for them.

Controversially, Tinder Plus is going to charge users over 28 four times the basic cost for younger users, which seems a strange move. Tinder has defended the move as being based on "extensive" tests of the marketplace, but by segregating the market like this, it surely runs a big risk of alienating users from wanting to use its services.

Some of the premium features include Rewind, to undo an accidental flick past a possible date, and a Passport feature, which lets users check out Tinder users in other countries.

Mario Figure Selling For A Song On eBay

Wallmart exclusive proves people have more money than sense

If you had £65 in your back pocket, what would you spend it on? Some new PC games, perhaps, or maybe some new peripherals or storage solution? Or would you spend it on a figurine of the computer world's favourite plumber?

The figurine is one of Nintendo's Amiibo characters, a limited-edition gold one, in fact, that was being sold exclusively at Wallmart for $13. Those figures sold out within 15 minutes of being on sale, and now they're reselling again on eBay for $100 and upwards. The technology industry has a long and illustrious history of selling character-based models and accessories, so it's perhaps not hugely surprising to learn that someone is prepared to spend more money than sense on these wee figurines.

Just know this: we are not the ones doing the bidding.

Smartwatch From LG Offers Smart Looks

Fourth watch from the firm

Wearable smartwatches were one of the big draws of the Mobile World Congress, and LG was among the companies wanting to make its mark.

The fourth watch from the firm, the LG Watch Urbane is certainly a looker. Centered around a 1.3", 320x320 plastic-OLED display, it promises all the communication capabilities of a smartphone in a polished, metal wristwatch, making and answering phone calls, push-to-talk capability with other devices on the same network, and a display with always-on ambient mode.

The watch runs Android Wear and is powered by the 1.2GHz Qualcomm Snapdragon 400 processor, and three physical buttons on the right-hand side allow for easy access to functions without having to swipe through a bunch of menu screens.

Wearables haven't really taken off yet but with something this good-looking in the works, it might not be too long before the industry has a genuinely interested market on its hands.

TP-LINK Archer C9 AC1900 Dual Band Gigabit Router

Mark discovers that AC class wi-fi can be had at a reasonable price

DETAILS
- **Price: £125.38**
- **Manufacturer: TP-LINK**
- **Website: uk.tp-link.com**
- **Required spec: Wired network or wi-fi devices**

The theory of AC class wi-fi is marvellous, and if you happen to have devices that can use both 2.4GHz and 5GHz bands simultaneously, it can be wonderful. But very few people have, and what AC ends up being mostly used for is 'n' connections or splitting your devices between the two frequency ranges.

Because of that, I'd probably not recommend a huge investment yet in this technology or finding an affordable router like the TP-LINK Archer C9.

This is an AC1900 cable design (no modem), which provides a theoretical 600Mbps at 2.4GHz and another 1,300MBps at 5GHz, and it allows simultaneous use of both through three detachable antennas mounted on top.

Around the back are two USB ports, one being USB 3.0 spec, and four gigabit Ethernet ports, along with a fifth for connecting to a cable modem.

The white and silver styling is pleasant enough, if a little Apple influenced, and the impression of high quality is somewhat undermined when you realise that the silver stand is plastic and not metal.

However, rather than what it looked like, the critical performance aspect of these devices is how they handle wi-fi, and in that respect the news is generally good.

On 2.4GHz this unit effectively utilises the available broadband, and at 5Hz it is actually better than most of the AC1900 routers I've tested so far – a somewhat curious development, given that they almost all use the same Broadcom AC1900 chip that the Archer C9 also employs.

So where does this design fall down? There are a few places, most notably in respect of the web-based user interface, which looks exactly like it was designed on a spreadsheet. Users need more consideration than smacking them with an 'Advanced Menu' that contains another 19 submenus. The lack of a defined access point mode was also a little irritating, and other features like VPN support are missing that you'd probably find on a Belkin or Asus design.

My other whine, and it's becoming incessant, is the USB 3.0 port performance. It doesn't deliver anything close to that spec, and writing speed is below USB 2.0 levels.

For these reasons I'd put the Archer C9 into the mildly frustrating category, where TP-Link missed having a truly excellent product mostly by assuming the market was exclusively geeks. Most people aren't, but they'd still like the better wi-fi performance that the Archer C9 can actually deliver.

If TP-Link sorted out the web interface and accepted that it just doesn't have the power to drive USB 3.0 properly, then this would be a workman like AC1900 router that many might consider owning.

For those that like what they hear about the C9, but need ADSL, TP-Link makes an almost identical D9 model with that features for about £20 more.

mm Mark Pickavance

Specifications:
- **Wi-fi:** 5GHz up to 1300Mbps, 2.4GHz up to 600Mbps, AC class
- **Processor:** 1GHz dual-core ARM CPU
- **USB ports:** 1x USB 3.0 port + 1x USB 2.0 port
- **Gigabit WAN/LAN ports:** 4x 10/100/1000Mbps LAN, 1x 10/100/1000Mbps WAN port
- **Antennas:** 3 detachable dual-band antennas
- **Dimensions (W x D x H):** 221 X 86 X 168.5mm

A solid AC1900 cable router in need of a GUI upgrade

XMG Prime

Reassuringly expensive but immensely powerful

DETAILS

- **Price: From £758 – Test model: £1514**
- **Manufacturer: Schenker/XMG**
- **Website: goo.gl/xl9Hx9**
- **Required spec: Monitor, mouse,**

We recently reviewed one of the gaming laptops from XMB, which turned out to be quite an impressive piece of kit. Now is the turn of the desktop, with the XMG Prime, a mini-ITX gaming PC that's exceptionally powerful and eye wateringly expensive.

As you would expect, the XMG Prime is a fully configurable system, something which can be done via the XMG Prime site. The system we were given features an impressive mix of hardware starting with an Intel Core i7-4790k 4GHz CPU and 8GB of Crucial Ballistix Sport 1600MHz memory, all fitted to the rather excellent Gigabyte Z97N-Gaming 5 motherboard.

Added to that is a Samsung 850 EVO 250GB SSD with Windows 8.1 pre-installed and a further 2TB Western Digital Red spinner. And cooling is provided courtesy of a Corsair Hydro Series H80i, with two large 120mm fans either end of the self-contained coolant radiator. Combine that with the i7-4790k and the stability of the Z97N-Gaming 5 board and you're looking at some serious overclocking potential.

The result from all that is a very powerful machine and one that makes the benchmark scoreboard light up. The 3DMark score was an impressive 11,873 – better than 97% of all other results. The same goes for the PCMark 8 score at 5,163, which again is a number considerably higher than what we're generally used to here.

It goes without saying that this is quite a formidable gaming PC. There isn't anything it can't run, and the chances are there won't be for quite some time to come either. It's not often we get a machine of this performance through our doors, so it makes for a pleasant change when we actually play everything with the highest possible settings. And that's without rolling up our sleeves for some overclocking shenanigans.

The design of the XMG Prime is quite stunning too, with a matte black finish the chassis complete with a flash of lime green trim on the front, various LEDs and the option to fit a similar green drive caddy and 120mm fan inside for added effect. It's enough to raise the eyebrows of the performance system builder, at any rate.

The inside of the Prime is superbly built, considering the compact interior space of the Fractal Design Node 304 case. The pipes of the Corsair H80i are probably the most intrusive aspect of the cable management, although to be fair they're not all that bad and there's little that can be done regarding effective water cooling pipe management.

Aside from the initial burst of fan speed from the GTX980, the Corsair H80i and the two front mounted 90mm fans, the system is reasonably quiet – enough that you don't notice it's running.

Overall, the XMG Prime is quite a stunning gaming PC capable of dealing with anything you could possible throw at it with aplomb. However, this kind of setup doesn't come cheap. The starter system specification for the Prime comes to £758, which isn't too bad for a well-built gaming machine. The system we were privileged to test, however, cost a wallet emptying £1,514.

But if you're prepared to part with that amount of cash, then this is certainly the PC to consider. Even the lesser powered entry-level £758 Prime is a capable enough machine. As the saying goes, you get what you pay for, and in this case it's top-of-the-range performance and quality.

mm David Hayward

An extremely powerful gaming PC with quality components

Dell Latitude 7350

Dell reimagines Microsoft's Surface into a more practical business tool

DETAILS
- **Price: £969**
- **Manufacturer: Dell**
- **Website: www.dell.co.uk**

Ever since Microsoft launched its Surface hardware, PC makers have been trying to copy the concept, even if it was an unmitigated commercial disaster.

These days it's widely reported that the Surface Pro 3 is a success, though oddly for a runaway best seller Microsoft is oddly coy about how many it's sold.

Whatever the reality, Dell is one of those companies attempting to steal whatever thunder Microsoft has going, with its Dell Latitude 7350.

Latitude systems by definition are aimed at business which, considering this is a Windows 8.1 system, seems a tough sell right from the get-go.

Its latest design is the Latitude 13 7000 series, which unlike the overly bendy Inspiron 15 reviewed recently, on first inspection appears very well made and beautifully engineered.

Inside its metal surface chassis is an Intel dual-core M-5Y10 processor (0.8GHz, 4M cache, 4.5W), 4GB of DDR3L at 1600MHz and a 256GB SSD drive. The 13" Gorilla Glass protected display is full 1080p resolution, and there are cameras front and back, NFC and networking via 802.11 a/b/g/n/ac wi-fi.

Along with all the things you'd reasonably expect, there are also some business specific features, including a fingerprint reader, SSD encryption and a smart card reader.

But the stand-out aspect is that you can detach the display entirely from the keyboard part of the 7350, where it becomes a touch-driven Windows 8.1 tablet.

Doing that, however, does introduce a number of sacrifices, and I'm not just talking about having to type on a screen. The first of these I noticed when I decided to

> **"Owners will enjoy the excellent 13" IPS panel and a responsive keyboard"**

plug a USB key in: Dell put all the USB ports on the docking portion of the system. Once in tablet mode you've got no USB ports, no SD card slot and no access to a second screen.

But you also disconnect from a portion of your battery power, reducing the operating life of the computer – one of its more compelling aspects.

On some designs you'd flip the keyboard underneath, but the hinge doesn't allow that angle or for it to be connected flipped over.

The message, if you're not getting it loud and clear, is that the Latitude 7350 is best with the backlit keyboard attached, and you're encouraged to leave it that way.

If you do that and ignore the like-a-Surface party trick, then you are rewarded with a truly excellent keyboard, fantastic battery life and great usability, even if it flies logically in the face of the whole concept.

For those who like to upgrade their systems, the 7350 is surprisingly featured for a Dell computer. The internal memory can be bumped to 8GB, the M.2 SSD can be swapped, and the battery even looks easily replaceable.

Performance is fine for office application use, though nothing that would excite mobile gamers. Intel's M-5Y10 is built to deliver passively cooled computing for a working day, although it can turbo boost from 800MHz up to 2GHz in a pinch.

Specifications:

- **CPU:** Intel Core M-5Y10 processor (dual-core, 0.80GHz, 4M Cache, 4.5W).
- **OS:** Windows 8.1 Pro (64-bit) multi-language English, French, German, Dutch, Italian.
- **Memory:** 4GB1 DDR3L at 1600MHz.
- **Storage:** 256GB Mobility solid-state drive.
- **Support:** Three-year ProSupport and next business day on-site service.
- **Security features:** Fingerprint reader, drive encryption, smart card slot.
- **Weight:** 3.67 lbs.

Intel's video is the HD Graphics 5300 standard, which in testing scored almost identically to the modest HD Graphics 4200 it's derived from.

Cynical people might consider this the specification of an expensive netbook, but it's built to operate on battery for a full eight-hour working day and not just half of it.

Owners will enjoy the excellent 13" IPS panel, a responsive keyboard and excellent build quality. But what I'd contend is that after a very short amount of time they'd entirely forget undocking it and using the tablet mode.

The problem Dell has here isn't the hardware design, because that's mostly fine; it's the concept of a Windows 8.x tablet that it has a hard time pushing. Because however you slice and dice things, the Microsoft's app store is a pale and limp shadow of what both Android and Apple are offering in their respective marketplaces.

Unless that radically changes in the next six months, and I see no progress, then the Latitude 7350 has been engineered to perform a trick that most people won't need.

That's a shame really, because those people at Dell who designed this system did some excellent work in packaging the technology in it.

If you want a mobile system that is truly portable and you can convince your company to purchase a system that comes with Windows 8, then you won't be disappointed by what the Latitude 7250 does well. **mm**

Mark Pickavance

A hybrid clamshell/tablet that is much better as a laptop

IRIScan Pro 3 wi-fi

With a cry of 'Have scanner, will travel', Michael reports on an IRIS product

DETAILS
- **Price: £168.19**
- **Manufacturer: IRIS**
- **Website: www.irislink.com**

Required spec: Windows XP or later / Mac OS X 10.5 or later

The IRIScan Pro 3 wi-fi is a portable scanner from the IRIS branch of the Canon family. This scanner can handle single pages and business cards, as it is powered by a rechargeable li-ion 3.7V 1700mAh battery capable of scanning up to 200 A4 pages at 300dpi from a single charge. A fold-away ADF (automatic document feeder) feature allows eight pages to be stacked for scanning.

Eminently portable with dimensions of 295 x 81 x 41mm (L x W x H) and weighing 800g, this scanner can accept documents of up to A4 size from the top of the unit and business cards from a slot positioned at the rear of the unit. A second slot, also located at the rear, is available for inserting a SD card to increase the scanner's memory from its default offering of 128MB. This memory is used to store scans when immediate access to either a Windows or Mac computer is not available.

An on/off power switch and micro-USB port are located on the left side of the scanner. The USB port is used when recharging the battery or linking to a computer for direct scanning. A standard-to-micro USB lead is provided in the box. As mentioned earlier, documents are fed into the top of the scanner while an area over to the right holds an LCD screen for providing feedback and the unit's touch-sensitive control panel. As well as activating scans, this control panel allows you to switch between 300/600dpi, monochrome/colour, JPEG/PDF and the destination to which the scan will be directed. This can either be memory or a computer linked via the USB lead.

The product's wi-fi feature only comes into play after documents have been scanned to memory. Like some other manufacturers, IRIS has opted for a wi-fi system that requires the computer to join with the scanner rather than the other way round. As a result both elements are not part of your home network but form a one-on-one link up. Once set up, this wi-fi link allows you to access the scans stored in memory via a browser. Various housekeeping tasks, such as downloading scans to a computer or deleting those no longer needed, can be carried out. While not as convenient as scanning direct to a computer, this method does remove the problem that can be caused by the lack of a computer.

When scanning documents or business cards, this IRIS device is no slowcoach. Perhaps not in the same league as Usain Bolt, this scanner took eight seconds to scan an A4 page at 300dpi, rising to 12 seconds at 600dpi. A business card was scanned at 300dpi in three seconds with a 600dpi version requiring four seconds.

Included in the box with this product are various software applications for Windows and Mac platforms. You get a copy of Readiris Corporate 14 for OCR and document management features plus Cardiris 5.0 Corporate for creating a database of business cards that have been scanned. mm **Michael Fereday**

Specifications:
- **Dimensions:** 295 x 81 x 41mm
- **Weight:** 800g
- **Scanner display:** 1.2" LCD
- **Built-in memory:** 128MB
- **Max Document size:** 216 x 356mm
- **Min Document size:** 88 x 50mm
- **Output File Format:** JPEG / PDF
- **Resolution:** 300dpi / 600dpi
- **ADF capacity:** 8 pages
- **Memory card:** SD card
- **Battery:** Li-ion 3.7V 1700mAh
- **Battery life:** 200 pages (A4 colour at 300dpi)
- **Software:** Readiris Corporate 14, Cardiris 5.0

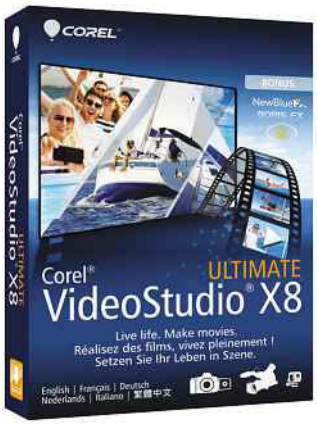
A scanning device that does not initially require a computer connection

VideoStudio Ultimate X8

EDITOR'S CHOICE micro mart

Corel's new VideoStudio Ultimate X8, comes with XAVC S support and a huge collection of additional content

DETAILS
- **Price: £79.99**
- **Manufacturer: Corel Corp.**
- **Website: www.corel.com**
- **Required spec: Dual-core 2GHz CPU Windows 7 or later, 2GB of RAM**



Corel VideoStudio was introduced in 2008 when Corel acquired ULead and with it its VideoStudio product. Since then it has changed considerably, with new features and plug-ins added with each new update. The product under review here is the latest Ultimate edition, which, because of the extras it includes, represents the best value.

With this update Corel has taken a good look at the method users adopt while working with the program. Consequently many of the changes to this version are designed to help you become more productive and as a consequence more creative. Take the edit list mode, for example, it's made it much easier to decide what clips to use by adding much more on screen information. Whereas before you would have to right-click and view properties, all this information is now instantly available, you get date, resolution, FSP, length, video and audio codecs used. Another admittedly small but important addition is a tick box in the corner of any media you use. This is only available in the thumbnail view, but instantly shows when a clip is in use, so you don't inadvertently add it a second time.

In order to keep pace with changing technology, Corel has now added support for Sony's XAVC S format. This is based on MP4-AVC/H.264, a new standard for video cameras that can support resolutions up to 4K - 3840 x 2160. It's also improved the support for the ever popular MKV format.

Going back to my earlier comment, the ultimate edition includes a huge array of 64-bit special effects and presets. There are ten new add-ons, with names like New Blue, Boris and ProDAD. They cover everything from image enhancement and motion effects, to pro titles, transitions and animated pen effects (you might use this with maps to show where you've travelled, for example). All these are in addition to the fairly comprehensive range of facilities Corel originally provided.

Another worthwhile effect new to this release is Freeze Frame; with this you can stretch the timeframe to highlight some event within the video. Perhaps as someone is about to dive or just before a surfer gets wiped out.

Don't you find it's difficult to find copyright-free music tracks to finish off your productions? Even then you generally end up editing the footage to fit the track, which is not an ideal solution. Yet the new Score Fitter in this version will create a track to fit your video. You don't have to worry about repetition either, because there are different genres of music, broken down into categories, songs and finally versions. If that's not enough, there are 17 free tracks from Triple Scoop Music to choose from as well.

If you produce tutorial videos or commentaries, the new Audio Ducking feature will be quite a time saver. It automatically reduced the volume of the background audio, making the voiceover much easier to hear; previously you would have to go in and tweak the volume settings for each voiceover individually.

This release of the Corel Capture utility has become more usable; it now records from full screen, a region or window and can include the system and microphone audio as well. I did a number of test captures recording both full and partial screens; the output is good, achieving high quality yet keeping the files sizes manageable.

Finally if you're struggling to find inspiration, you can turn to the instant projects, these are a selection of video beginnings, middles and ends or even complete projects if you like. They come with effects, music and transitions, all you have to do is slot in your own video content.

There's very little that Corel has missed with this release, which considering the price to content ratio, is exceptional value.

mm Joe Lavery

A massive update to what was already a very comprehensive suite

micro mart
9 Quality
9 Value
9 Overall

Dying Light

Anthony has a go at walking with the dead

DETAILS

- **Price: £39.99**
- **Manufacturer: Techland**
- **Website:**
- **Required spec: 3.3GHz dual-core CPU, 4GB RAM, 40GB disk space, Nvidia GeForce GTX 560 / AMD Radeon HD 6870 GPU, DirectX 11, Windows 7 64-bit or later**

Bump into the Micro Mart team first thing on a Monday morning, and you might well think the zombie apocalypse has already started. But it hasn't, and after a few strong coffees and a pile of pain au chocolate, the horror of that vision mostly dissipates.

In Dying Light, though, you're not so lucky. You take the role of Kyle Crane, an undercover agent, dropped into the quarantined city of Harran, which is being overrun by not only zombies but also bandits, led by the ruthless warlord Rais.

But things don't get off to the greatest of starts. Pretty much as soon as landing, Crane is bitten by a zombie, so he spends the entire game infected with the virus. Fortunately, he gets an injection of a medicine known as Antizin, which despite not being a cure, will delay the symptoms.

From a plot perspective, there's nothing particularly new here. The main protagonist enters the drama with certain, somewhat selfish and inconsiderate intentions, but pretty soon he bonds with the ordinary people of the city and eventually begins to put their needs before the commands of his superiors. It's all quite standard 'road to redemption' fare, but it's well acted, and the graphical presentation is excellent.

What makes Dying Light really worth playing, though, is not the story but the freedom it gives you to explore the city. Using a parkour system, similar to the one in Mirror's Edge, you're encouraged to leap over rooftops, run along walls and generally jump around like a well-trained ninja. With no fast travel system in the game, this is essential if you're to traverse the city efficiently, and it's also vital for escaping from the more difficult enemies that only come out at night (the good news is experience points are doubled when the sun goes down).

And as you explore, you also discover. Everywhere you go, there are things to pick up and cupboards to loot. And every little thing, from bits of string to bottles of alcohol, can used to craft something more useful, like weapon upgrades and med kits. Again, that's not hugely original, having featured in many zombie games, such as Dead Rising and Dead Island (which was created by the same developer as Dying Light), but it's fairly straightforward, meaning you don't have to spend ages messing around in menus.

On top of this, there are plenty of side mission to carry out, and as you progress you get to upgrade your character with new moves and statistics. Plus you can play the campaign mode in co-op mode with up to three other players. It's all competently put together, but clearly it's also somewhat derivative. Throughout the game, it's hard to shake off the feeling that you've seen it all before. The voice work and some of the animations make you think of Far Cry 3, while some of the interactions with secondary characters are reminiscent of Fallout 3 or even Borderlands. Deja vu is almost inevitable.

Familiarity isn't the only problem with Dying Light either. For a start, the controls are a bit awkward, and they seem geared more towards playing with a gamepad (an Xbox controller is perfect, of course). Thankfully, you can edit the key mapping to suit your tastes, so it's certainly workable.

More of a problem, however, is how badly optimised it seems to be. Running on a quad-core i7 chip and an AMD 6970, it frequently dropped below 30fps, even when we lowered the resolution. Yes, the graphics card is pretty old, but it should still be able to run this game, seeing as it can render Far Cry 4 effectively at 1080p.

Of course, that's an individual problem, and if you're lucky enough to have a more powerful system, then it's not one you'll experience. Bearing that in mind, what you have with Dying Light is a solid piece of entertainment, which offers plenty of play time and a lot of fun. It might borrow heavily from other games, but that's not necessarily a bad thing.

mm Anthony Enticknap

Not hugely original but entertaining nonetheless

Crucial MX200 1TB SSD

Crucial addresses some subtle technical points in the MX100 with a new drive

DETAILS
- **Price: 250GB £93.59, 500GB £171.59 1TB £365.99**
- **Manufacturer: Crucial**
- **Website: uk.crucial.com**
- **Required spec: SATA-3 port and SATA power**

I'd be the first to accept that not everyone is in the market for a £366 1TB SSD, although the fact Crucial now makes one strongly suggests that there is a market.

This is the flagship design in its new MX200 series. Building on the positive reactions to the MX100, it has looked to address the weak points of that generation with the new drive.

However, testing this unit I ran into some problems that aren't really of Crucial's making but represent well where SATA technology and SSDs are currently.

All three MX200 drives are rated to 550MB/s reading and 500MB/s writing, but getting that level out of any of my systems proved challenging. My cap on whatever system I use appears to be about 532MB/s reading, though I did manage nearly 514MB/s writes – faster than specified.

The problem isn't the drive; it's how close this hardware takes a system to full saturation of the SATA-3 bus, a problem that only SATA-3.2 or PCIe-connected M.2 drives will actually resolve.

To be fair, these numbers aren't far away from what the MX100 could do, so where is the justification for MX200 customers? There's a pretty big one if you hammer your SSD drives hard and would prefer they didn't expire in the middle of a critical exercise.

The 256GB MX200 has roughly the same TBW (total bytes written) as the MX100 had, at 70TB. However, you can double that with the new 512MB MX200 and quadruple it with this 1TB option. That's a whopping 320TB, or 175GB every day for five years.

Obviously, I can't test this assertion unless I wanted to bring you this review in 2020, but if it was horribly wrong it would probably undermine the company's profitability. However, given this predicted reliability, it does seem a little odd that Crucial only gave it a three-year warranty, whereas Samsung is now offering five years on its 850 EVO design.

Along with the 2.5" SSD package covered here, Crucial also has MX200 modules in mSATA and M.2 (Type 2260 and 2280) form factors. However, in the other form factors the maximum size is 500GB, whereas the 2.5" drive has a 1TB option.

When the MX100 arrived, it was pitched as not replacing the flagship M550 but providing a more cost effective second string. The MX200 looks very like it just took the M550 position as the SSD weapon of choice in this arsenal.

The MX200 is a generally positive story all round, because not only does it deliver 100K IOPS even in the entry level 250GB drive, but it also offers significantly higher levels of durability in the larger capacities.

And only ten months on from the MX100, it's also about 50% cheaper.

The 1TB MX200 is still probably more than most people would probably want to spend on a desktop/laptop drive, but the 250GB and 520GB look highly desirable for anyone wanting an effective upgrade.

mm **Mark Pickavance**

High performance, massive capacity and great endurance

micro mart
8 Quality
7 Value
8 Overall

GROUP TEST

Standing Desks

Sitting down all day isn't good for you. Unless you're very strict when it comes to your posture, and the length of time you spend working when sitting, there can be some drastic health side-effects. Standing when working improves your posture, burns more calories and keeps you in better general health. With that in mind, David Hayward stands to attention with six standing desks to see which are best to work with

Standing Desks

DeskRite 200

DETAILS
- **Price: From £467**
- **Manufacturer: DeskRite/Posturite**
- **Website: goo.gl/UQgtwR**
- **Required spec: Phillips screwdriver, two-person construction**

The DeskRite 200 is one of the cheaper models of ergonomically designed desks from **Posturite.co.uk**. However, that doesn't mean it's lacking in any particular aspect.

It's of a solid construction: wood-topped, with a Maple MFC finish and a pair of cable access holes either side at the rear of the desktop. It also comes in a variety of widths, from 1100mm to 1800mm, all of which are fitted to a sturdy and easy to assemble aluminium frame – complete with rubberised feet for extra stability. The desk depth is a reasonable 800mm deep, with a thickness of 25mm, which makes it ideal for most any computing purpose.

In its default position, the table is at a height of 720mm, but thanks to a hand crank (located at the front right-hand side of the desktop) it can be raised to a height of 1180mm, around stomach height for a six foot person. That full extension will only suit a taller users though; someone who is 6ft would probably need to lower it an inch or two so their elbows aren't raised too high.

The desk itself has ample room to fit a workstation, even a dual screen monitor setup. Add to that the fact that the weight limit for the DeskRite 200 is rated at 60kg, and you've got a perfectly functional and capable standing desk. Mind you, as with all the desks we're looking at in this group, you'll have to check what your preferred placement of a PC will require in terms of cable lengths for the peripherals, if you don't want to be 'caught short', so to speak.

After using the desk for just a few hours we certainly felt we'd found a much better working posture. We found it to be very comfortable and certainly less of a strain on the back and shoulders.

This is not the most stylish desk we've ever seen, however, if we're being honest. When all is said and done, though, once you have a pair of monitors, keyboard, mouse and mat – alongside sundry other notes, writing pads and so on – the last thing on your mind is what the desktop actually looks like. At least it that's how it is for us.

The winding up and down of the desk is a smooth motion and one that's easy to do. The handle is plastic, which we did think was a little cheap-looking and potentially flimsy, considering the high quality of the rest of the unit, but it's functional enough for the job at hand. We did like the fact that the handle can fold away against the underside of the desk when not in use, though, which alleviates the potential for forever knocking our hip bones on it as we move around.

The instructions were reasonably clear, some of the images did seem to be a little faint but not enough to stop us from working out what part went where. Thankfully, and as you'd hope, everything was in place without the need to call the support centre for any spares.

It is a little pricey, though, we have to admit. With the costs beginning at £467, and moving up just over £500 for the 1800mm width desk, it's a decent sized investment. Yet, this is a desk that's capable of lasting a good number of years if looked after properly, so it all depends on how much you value the health benefits, really.

Ikea Bekant

DETAILS
- **Price: £445**
- **Manufacturer: Ikea**
- **Website: goo.gl/sZMUEZ**
- **Required spec: Philips screwdriver, spirit level, two person construction**

We can't have a group test about furniture without including the king of the flat pack, Ikea. Surprisingly, the number of standing desks from Ikea rival that of any other specialist supplier, and the quality too is of a much higher standard than you would expect. The Bekant, for example, may look fairly unassuming with its flat desktop and lack of cable tidy holes, but there's a lot more going on with this desk under the surface.

To start with, this is a 1200mm long, 800mm deep desk that's a tad under 23mm thick. The top itself is Melamine foil coated particleboard with plastic trim. This means it's easily cleaned and amazingly pretty sturdy too, with a weight rating of 70kg. The corners are rounded, which equally match the feet and the overall aesthetics of the rest of the construction.

In its default position the desk stands at around 650mm in height, but can be raised to a less modest 1250mm should you wish. This is more than enough for those who exceed the six foot mark, in fact it's uncomfortably high for six footers and at it maximum height will suit someone who's as much as six inches taller than that.

The desk is also electronic, meaning that rather than a utilising a manual crank handle, raising the height is simple affair involving a pair of buttons – one for up, one for down. The cables for these electrics run on the underside of the desktop in a narrow channel down the centre that's covered with a piece of netting and secured on all four corners by a set of pins. We didn't like this too much, though, as it felt like more of an afterthought rather than an integral part of the design. This is a shame, as overall the electronics are a great feature to have. It does manage, though, is to keep the cables from looping down and dragging on the floor or snagging with any kit you may have stored under the desk, so in essence, while it looks pretty awful, it is at least functional.

Construction of the desk is actually fairly easy, considering the reputation of Ikea for driving DIY-ers crazy, and that there are a pair of motors and various cables running to and from them to deal with. It did take us the best part of an hour, but then we were reviewing the steps and taking our time over it. One thing we did like regarding the setup was the fact that you can place the control box, the two button box, anywhere along the long sides of the desktop. So both right and left handed users are catered for, and you're not penalised for preferring one side over the other.

The motors are well made and extremely quiet too. You don't really hear them whirring unless you pin your ear to one of the legs. We did have some vibration in one of the legs to begin with, but after shifting the motor over slightly – we must have placed it slightly wrong to begin with – the vibration stopped and we were left with blessed silence.

The Bekant is a very sturdy desk. Even when you lean on one side or leaning against the side while standing, there was no movement or wobble. For £445, the Ikea Bekant provides an excellently made, motorised desk, that's simple to use, clean and capable of being a functional workstation.

micro mart
8 Quality
7 Value
8 Overall

Varidesk Pro

DETAILS
- Price: £295
- Manufacturer: VariDesk
- Website: goo.gl/hN6PRW
- Required spec: No construction needed, comes fully assembled

While it's all fine and well having your desk move up and down, it's not always practical. For example, we're not always at the same desk or we may already have a desk or some work surface that's built in to the area we're currently working at, and a new desk's dimensions may not fit that area.

Varidesk offer an answer to such problems in the form of the Varidesk Pro. This is actually a riser unit that is designed to stand on an existing desk, and allows the user to move from a sitting position to a standing one in a matter of seconds.

The Varidesk Pro is actually quite an ingenious idea. The unit is made up of a solid plastic desktop that measures 914mm in length and 685mm deep, with a slide out keyboard and mouse section that is 330mm deep. The top is enough to fit a couple of decent 24" sized monitors side by side in a dual screen setup, and the keyboard section will house a standard, more office based keyboard and mouse combination well enough; although some of the more elaborate gaming sets may be a bit tight when squeezed into their allotted section.

The genius part of this setup is when you grasp the two handles either side of the desktop. This activates the spring loaded pneumatic mechanism which gently raises the desktop section 410mm from its start position. This means that when placed on an average height desk, which is around 700mm, the height of the desktop can be raised to a standing use height of 1110mm.

It's not the highest position we've seen so far, but for someone of average height – which, we told, is now 5' 10" – it's plenty. However, those who are taller, even just a couple of inches (say, 6ft), may find it just a tad too low.

To put the Varidesk Pro back to the sitting position, all you need to do is grab the handles again and gently push it down until it locks into its lower position. This all sounds great on paper, but we did have a few issues with the Varidesk Pro.

The main problem is with the keyboard section: while in the sitting position it works well enough and is ergonomically positioned but, when you pull the handles to raise the desktop, the keyboard section is left on the desk the Varidesk is sitting on, so you have to move it to the desktop to work. For a wireless keyboard and mouse setup this isn't a problem, but for a wired keyboard and mouse you're going to have route the items through the back of the frame and on to the desktop.

The second issue is regarding the cables, the monitor and anything else that's dangling down and connected to the base unit. When you lower the Varidesk from the standing position it has the nasty habit of snagging the cables and trapping them in the back of the frame. So you need another set of hands to move the cables and close the desktop up.

Saying that though, there are ways around such minor annoyances, and we did like the Varidesk Pro. For many people, at £295, the Varidesk Pro will represent a more enticing option than buying whole new desk – even with the product video that declares you're at risk of premature death if you sit around all day. If you can work around the issues, then this is certainly one to check out.

> **"If you can work around the issues, then this is certainly one to check out"**

Brenta Wall Desk

DETAILS
- **Price: £169**
- **Manufacturer: Brenta/John Lewis**
- **Website: goo.gl/xOfaog**
- **Required spec: Philips screwdriver, drill etc.**

While the Varidesk Pro may have diverted somewhat from the standing desk format, the Brenta Wall Desk from John Lewis is positively straddling the border line of the concept.

That's not to say it isn't a certainly a novel idea and a viable way of avoiding having your desk permanently on show and taking up valuable space in your bedroom or home office. As such, the Brenta Wall Desk is exactly as its description portrays: a desk that's fitted directly to your wall.

If space saving and/or hiding unsightly work is a must, and you still wish to stand up when working from a laptop, then this could be the ideal solution for you. All you need to do is screw the item together, fit the gas filed hinges and fix the unit to a convenient wall at a height that suits you best.

> **"A novel idea and a viable way of avoiding having your desk permanently on show"**

The Brenta has a sturdy oak trim to which a metal desktop measuring 420 x 720 x 81mm is fitted. You'll need measure the correct height that's most comfortable and ergonomic for you personally and take the bottom of the unit as that measurement when fitting it to the wall.

Fitting everything together is easy enough, taking around half an hour from unpacking. The only real issue of course is the quality of the walls on to which you'll be fitting the Brenta. The recently plastered wall, behind which is a 120 year old crumbling brick wall, we used was adequate enough, although we didn't fancy the idea of putting too much weight on the tray.

As you can surmise, this isn't a desktop that will house a traditional monitor, base unit, mouse and keyboard set, along with all the other elements that could make up a user's computer. This is purely for the laptop or tablet and fold out keyboard user. While that in itself is something of a negative, it's not all bad.

For one, the Brenta is quite a stylish looking unit, and when folded out in to a working position it's perfectly functional as a laptop workstation.

When folded up though it's quite unsightly, we must say. The oak finish around the trim is pleasing enough, and we think that a matching finish could have easily been applied to the underside of the fold down tray, that way when folded you have a wooden unit on display on the wall. To further that idea, perhaps John Lewis could include a way of fixing a picture to the underside, to make it look more like a picture in a frame rather than something that resembles a dumb waiter.

Aesthetics aside, for £169 the Brenta Wall Desk is a functional concept that's a lot more affordable than a near-£500 desk if you can successfully apply it – and we have to admit, we did like the fact that, when it's not in use, we have all that extra floor space available that would otherwise be used up and wasted on a desk. Depending on the thickness of device you're using, you could even close the tray with the laptop still in place.

All in all, the Brenta Wall Desk is a good, if niche, standing workstation. Just check your walls before committing to buying and fitting.

Herman Miller Alvar Lite

DETAILS
- Price: From £936
- Manufacturer: Herman Miller
- Website: goo.gl/2L2JgM
- Required spec: Philips screwdrive, spirit level, two-person construction

Herman Miller is a company that has seen quite some success over in America. The company often attends the CES and show off its range of chairs and desks to an eager audience, yet it doesn't seem to have made much of an impact here in the UK.

The Herman Miller Alvar Lite is at the entry-level of the range of Alvar height-adjustable desks. This particular model comes with a wide range of options, but the default desk on offer has a width of 1200mm and a depth of 800mm, with a 25mm thick square edge detail. The dimensions can be increase though, at a price of course, from the initial 1200mm through 1400, 1600, 1800mm to an impressive 2000mm – which incidentally adds £86 to the starting price (which we'll cover in a moment).

The desk also comes in a bewildering range of finishes, from a rather sterilised looking 'Chalk White' (Melamine-coated particleboard) and running through such choices as Maple, Folkstone Grey, Havana Cherry, Napoli Oak and Charcoal Ash. Needless to say, there's a colour and finish to suit most people.

The height adjustment side of things starts at 650mm and rises to a maximum of 1250mm, either by a mechanical crank handle or through an optional electrical motor, which provides three memory settings for you to can select from – beyond the simple up or down function.

1250mm is ample for most users, catering for the average height a modern human, although much taller users may need something that can raise the height to a few more centimetres. There are also indents along the rear of the desktop that act as cable runners, and there's an optional cable tray to help tidy things up.

Construction of the desk, the mechanical version, is fairly simple. Although it took us a while due to the fact that it's quite heavy and a little unwieldy. It's definitely, we feel, a two person job. Anything less and you you'll risk doing yourself an injury.

> **"Everything about this desk has an option and can be upgraded or changed"**

Everything about this desk has an option and can be upgraded or changed should you feel you need to do that, which we liked. The choice of how you want the desk to appear and work is commendable, but with that comes a bit of hefty price tag.

The standard, mechanical, Chalk White, 1200 x 800mm desk costs the princely sum of £936. When you factor in the electric height adjustment, a 2000mm by 1000mm desktop and a cable tray to fit that size, you're looking at spending an eye-watering £1095.

The quality of the Herman Miller Alvar Lite is very good. It's a classically designed, sturdy desk that will no doubt last you a good number of years, and naturally there's the ergonomic benefits of standing too. However, we can't really justify spending nearly – or, more likely, over – a thousand pounds on a single desk, not when there are other examples out there that do an equally good job for around half that high price.

Although it's good, and it's wonderful that their's such a variety of shapes, leg shapes and sizes, and other variations on the theme, the Herman Miller Alvar Lite is just a little too expensive for our (and, we suspect, most other people's) taste to warrant a higher score.

NUDO Standing Desk

DETAILS
- Price: £684
- Manufacturer: Jonas & Jonas
- Website: goo.gl/dsPt31
- Required spec: A very light laptop, and perhaps a locking bolt for the tripod

We here at *Micro Mart* like to spread our groups tests to as many corners as possible. With standing desks, these corners are numerous and can be filled with everything from the functional, as we've already seen, to the excessive and not so functional, which is what we're about to look at.

The Jonas & Jonas branded NUDO standing desk is one of the more simple concepts we have seen so far. Designed by Karsten Weigel and Brend Benninghof, this tripod desk is made up of two main sections. The first is the desktop itself, which measures 600 x 450mm and is a Melamine coated MDF plate, with a slightly rough texture for extra grip.

The second section is the large stainless steel tripod stand, which comes to a height of 990mm initially and can be extended to a maximum of 1140mm. At the top of the tripod is a section where the desktop slides into via a stainless steel shaft protruding from its underside. The shaft is then locked into place, once you have the desired height, with a thumb screw.

The top isn't any good for a traditional desktop, that much is pretty obvious, but for a tablet or smaller laptop, netbook or whatever, then it's ideal. Plus, the angle of the tilt of the desktop can be altered from flat to around 45-degrees, to make it more ergonomically pleasing to use.

> "There a few aspects of this desk we don't like. The first is the price"

There a few aspects of this desk we don't like. The first is the price, which comes to £684. Yes, you read that right: £684 for a tripod with a flat bit on top. Even those with wads of folding stuff to spare would probably baulk at spending that kind of money on this, regardless of how well designed it is or by whom.

Which, unfortunately, leads up to a second problem: the stability. While the tripod design is uniform and reasonably sturdy, we did find the top section wobbled slightly, and the thumb screws did have the tendency to work loose – only slightly, but enough to make one continually worry about whether they would eventually loosen enough for the technology sat on top to come crashing down.

Although this is designed to be a very trendy item to own, no doubt by the hip and modern minimalist, it is pretty useless as a workstation. Even the trendy London gallery boutique worker will find this an irksome thing to work on. So, while we're tearing into the design, we may as well mention the fact we were constantly tripping over the splayed legs. Something which you don't want to do when there's potentially an equally expensive laptop sat on top of it.

There's not much to endear the NUDO standing desk to our hearts. It's far too expensive for a lump of stainless and MDF, and it's not particularly functional either when you take into consideration the trip hazard and lack of stability.

Unless you have an investor who showers you with golden largesse or you have money to burn, then there's little point in taking the NUDO standing desk into consideration for your next desk purchase.

Ikea Bekant

We liked the Ikea Bekant. It was a practical, simple, well-built, sturdy and reasonably priced height adjustable desk – and one that will last for quite some time to come, we imagine. It also had the additonal electric adjustment facility; that was a winner, despite the less than ideal cabling system.

Varidesk Pro

Although we highlighted a few issues with the VariDesk Pro, when it comes down to it, we think it's a sterling idea – and one that could be used to great effect. It's a good problem solver for those who need or want to stand at work.

The VariDesk Pro Plus, which is slightly more expensive, offers a height adjusting keyboard stand as well, which eliminates one of the main issues we had.

How We Tested

Each desk was tested with a tablet, laptop, nettop and full desktop base units, with either single or dual monitor setups. It also involved two of us constructing the desk, where necessary, with a third watching and offering unwanted advice throughout the entire process (optional).

	DeskRite 200	Ikea Bekant	VariDesk Pro	Brenta Wall Desk from John Lewis	Herman Miller Alvar Lite	Jonas & Jonas NUDO standing desk
Price	£467	£445	£295	£169	£936	£684
Desktop width	From 1100mm	1200mm	914mm	720mm	From 1200mm	600mm
Desktop depth	800mm	800mm	685mm	420mm	From 800mm	450mm
Initial height	720mm	650mm	127mm – from desk	Custom	650mm	990mm
Max height	1180mm	1250mm	410mm – from desk	Custom	1250mm	1140mm
Electric movement?	No – hand crank	Yes	No – pneumatic spring loaded	No – pull down oil-filled hinges	Yes – optional though	No – Tripod locking nuts
Max weight allowed	60kg	70kg	16kg	9kg	60kg	? – not much
Desktop PC capable?	Yes	Yes	Yes	No	Yes	No
Laptop/tablet capable?	Yes	Yes	Yes	Yes	Yes	Yes

Your Letters

Ancient Computers

I very much enjoyed your article on 'Ancient Computers Still In Use', as it brought back many memories. I started working in October 1979 in engineering computing. I was writing, maintaining and transferring calculation programs from one computer to another.

When I started, the department had been using an ICL 1906A mainframe computer for the larger programs and a PDP 11/70 minicomputer for smaller ones. The operating system for the 1906A computer was George III – for its day, a very capable system. It was quite easy to use even for those of us who were mathematicians or engineers rather than computer scientists.

About this time ICL shot itself in the foot, though. When it replaced the 1900 series mainframes with the 2900 series, it wrote a completely new operating system (VMEB - K) that was nowhere near as easy to use as George III.

As an example, if you wanted to create a data file in George III, the command you typed in was:

in filename,T////

Then you typed in the data, and signalled to the computer you had finished data entry by putting the four terminating characters (////) on a new blank line. As I remember, while George III only required that one line for the task, VMEB required you input 14 separate steps.

When the computer services people tried to teach us how to log into the 2960 computer, it took all morning.

VMEB was useless for us. Someone realised that this would not be acceptable in our situation, and decided to change from ICL to the DEC VAX 11/780 computer. ICL had thus thrown away an important customer.

Some of our department's work was done in George III scripts. So, when the 1906A was no longer supported, these programs had to be reworked for use on the VAX 11/780 that replaced it. The operating system version for the new computer would not do what George III had done, so it was decided that all non-trivial programs were to be written in FORTRAN IV.

Some programs had been written in FORTRAN IV – but this was ICL FORTRAN IV. It had non standard extensions such as a set of linear algebra routines. These were embedded in the coding, so copying the source code to the new computer did not work – the program had to be rewritten.

Another problem we had was the word length of the 1906A – it was 48-bit. Some routines like matrix inversion routines, which were fine in a 48-bit word length, fell over when the program used 32-bit variables – so we had to use 64-bit variables. However, for some things, such as in labelling graphs created by bought-in software packages – we had to use 32-bit integer variables.

Every computer had its own operating system. I understand that IBM had a different operating system for each of the three size ranges of its computers. I have never worked with IBM computers, so cannot be sure, or even say if learning one would help with others. I did work briefly with a PDP 11/70, its operating system rejoiced in the snappy name of RSX 11M – which probably meant something to someone. It was quite primitive – there was limited physical memory, and virtual memory management had not been invented. Only part of the program could be in memory at any time, and it was the programmer's responsibility to organise this.

I worked for several years with a VAX 11/780. Documentation for the operating system used on this computer filled a six foot high double door filing cabinet. If you needed to really understand what the computer was doing, you needed to learn the operating system. I very much suspect that the old computers mentioned in your article are still in use because of the cost of program transfer – the lack of the necessary expertise and the lack of political will at the top of the organisation to invest the necessary resources to do the work properly.

JJ Reynolds

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Life In The Old Droid Yet

We look at how to put an old Android phone to use, rather than trashing it or selling it

Just got a new phone? Well, then you're probably aware that in 24 months, you'll be popping out or heading online to find another new one. Yes, you might be excited about having the latest technology in your pocket right now, but after two years, your amazing new gadget will inevitably look a bit rubbish.

So what do you do with your old phone when the time comes to upgrade? Do you just sling it in the nearest bin, while trying to silence the nagging voice in your head, scolding you for doing something so environmentally unfriendly? Probably not, unless it's damaged beyond repair (the phone, not your head).

You could sell it, of course, and you'd no doubt find plenty of takers on eBay, assuming it's a decent handset and in good condition. Or you could try to trade it in, to get some money off whatever new deal you end up signing. If you're feeling more generous, you could even just give it away, whether that's to a family member or friend, or just some stranger from Freecycle.

These are all good options, but there's also another choice you could make that you might not have even considered: you can keep it. And no, we don't just mean throwing it into a drawer somewhere and forgetting about it (along with those parallel cables and floppy disks you're holding on to, because they might come in handy one day). What we mean is actually making use of it, so it genuinely enhances your life rather than just being another piece of clutter.

And even if you don't already have a drawer overflowing with old smartphones, then one of the ideas here might make it persuade you to out and buy a few.

Media Centre

If you're lucky enough to have an old phone that comes with some kind of TV output, then you have all the makings of a highly portable media centre. For example, if your smartphone supports MHL (media high-definition link), then you can use an adapter that goes into the USB charging port at one end and provides an HDMI port at the other. This gives you the option of hooking up to an HD TV or even a projector. Find yourself a handheld pico projector, and you can easily carry your own home theatre with you wherever you go. Without the speakers of a television, you'll need something to provide a volume boost, but that problem is easily solved with a speaker connected via Bluetooth or physically using a 3.5mm jack.

As for content, you can, of course, play video or music files located on your phone's memory or SD card, although you'll likely need to install a third-party media player, because many video file types won't play on most phones' built-in players. There's no shortage of options here, both free and paid for, but MoboPlayer and mVideoPlayer are among some of the best.

You also have the choice of streaming. Services such as Netflix, Spotify and the BBC iPlayer can all offer a large selection of entertainment, assuming you have an internet connection.

If you'd prefer to stream content from your home network, which might be stored on a PC or a NAS drive, then that's also possible. For that, the app BubbleUPnP will be perfect. As well as being able to stream content from your phone to other devices and computers on your network, it also enables you to access their stuff too.

Remote Control

If you already have a media PC, then you don't need to hook up your old phone to watch films on your TV. But that doesn't mean spare mobile devices can't form a part of your home theatre setup anyway. With the right software, you could easily use an old handset as a remote control for your media system.

Although some phones do have infrared transmitters (including the Samsung Galaxy S5), this is relatively rare. Anyway, it's great for remote controlling TVs, DVD players and other dedicated technology like that, but it's not so useful for media PCs. Even if yours does have an infrared receiver, the sort of commands you can send are fairly limited, compared to what you can do if you use wi-fi or Bluetooth remote control apps.

There are loads of these available for Android, but one that we're rather keen on is Unified Remote. It

“You might be excited about having the latest technology, but after two years, your amazing new gadget will inevitably look a bit rubbish”

TeamViewer is just one of many great remote access apps

Use an MHL cable to get HDMI

supports connections over Bluetooth and wi-fi, and it comes with tons of preconfigured remote controls for popular apps such as Windows Media Player, VLC and Spotify, but you can also use the app to create your own custom remotes. It also offers you the ability to use your phone's touchscreen as a trackpad and to input text on your PC with the mobile's keyboard. You need to have the server app installed on your PC, but it's pretty non-intrusive and just adds a small icon to your notification tray.

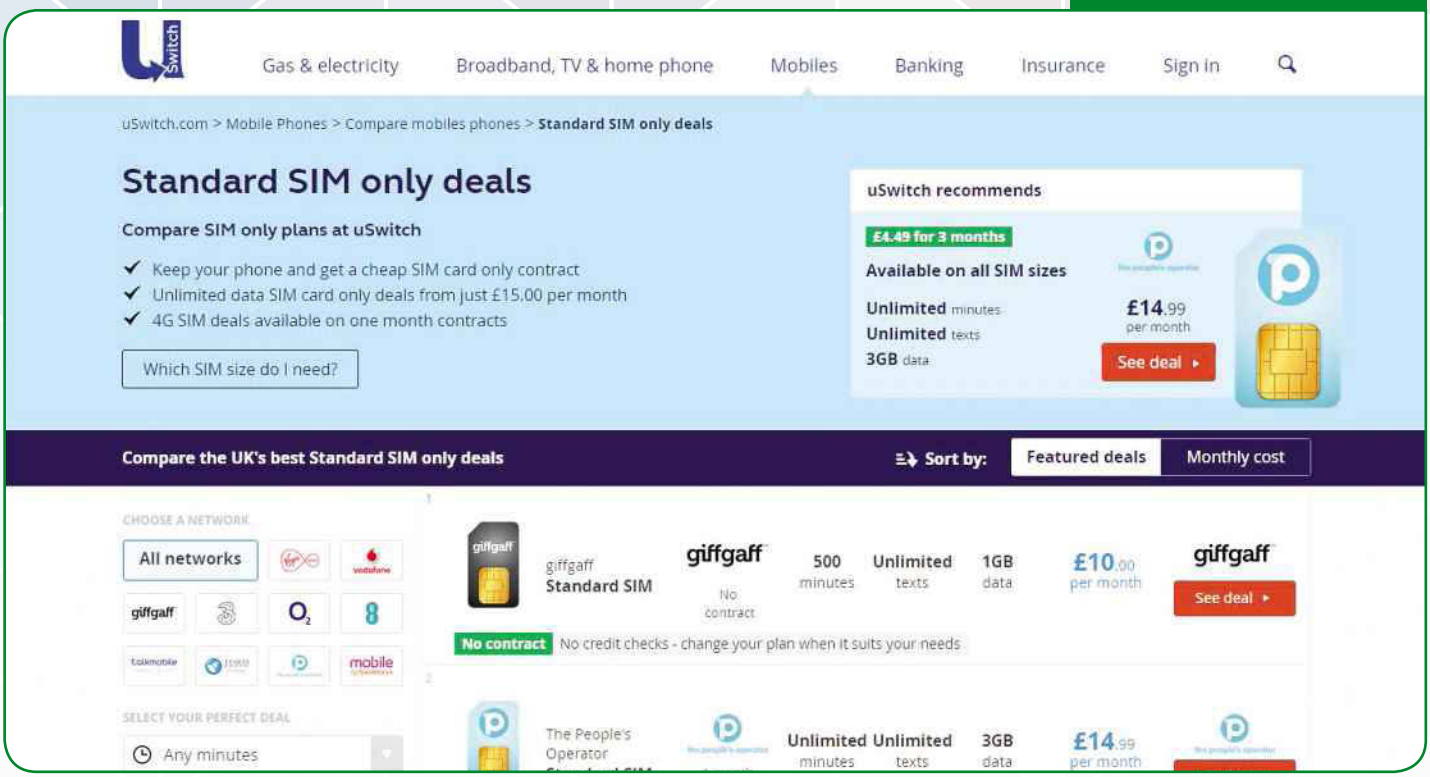
Another way to remote control programs is using the mobile versions of said software. For example, if you're watching something on Netflix on your PlayStation 3, when you open the app on your phone, you'll see a streaming symbol in the top right. Tap this and you get prompted to decide where you'd like to play videos from. If you choose the PS3, then whatever you open on the Android device will play on the console, rather than on the phone itself, and you can use the handset to control playback. This makes browsing far more intuitive, and it's also a feature that you'll find in Spotify and YouTube, among others. If you're a Virgin Media customer, check out the TV Anywhere app, which enables you to do all this, as well as being able to access the TV guide and set up recordings (if you have a Tivo box).

The great thing about using an old phone instead of your current one as a remote is that you don't have to worry about messages or calls getting in the way of you using it for this purpose. Normally, you might find that a message comes through, and to read it you have to switch away from the remote control, then switch back to use it again. If your old phone doesn't have a SIM card, that's not going to happen.

Remote Access

Taking the idea of remote control to the next level, remote access software grants you the ability to see your computer's screen from any location with an internet connection or another device in your own home network. We can personally attest to the usefulness of this technology, having averted a minor publishing catastrophe by remotely accessing an iMac using an HTC Desire (yes, it was quite a few years ago) and a somewhat ropey 3G connection.

At that time, we used LogMeIn, which was one of only a few remote access apps for Android, but these days you have far more choice, and the features they offer have grown in number too. For example, you could try a Splashtop product. There's a huge range of its apps available, and the free one will allow you to stream over a local network from a PC or Mac to an Android device, which could be useful for a media centre or for moving files around from a different part of your house. It also offers access over the



Sites like uSwitch will help you get a good deal on a 3G SIM card

internet, but this requires you to pay a fee for the Anywhere Access pack ($1.99 monthly or $16.99 a year). There are also various paid-for versions, which don't require a subscription, so it's worth researching them all before settling on one.

Also, bear in mind that there are quite a few free apps that do the same thing, such as TeamViewer and Microsoft Remote Desktop. We haven't tried them all, so we can't say how good they all are, but what we can say is that we've been able to quite satisfactorily locally stream a PC game with full audio to an Android tablet using Splashtop, so perhaps you get what you pay for. (On a side note, take a look at the app Kainy for dedicated PC game streaming, because it features a number of gaming-related tweaks and optimisations.)

Nevertheless, we'd recommend trying the many free options first, before laying down any cash. Of course, if you buy an app you don't like from the Play store, you always have the 15-minute window to decide you don't like it and get a refund.

Mini Games Console

Whether you're hooking your old smartphone up to an external display or just using its built-in screen, it can function as a pretty decent gaming machine. Of course, it very much depends on the spec of the phone, but any flagship handset from the past five years should be more than enough for this purpose.

Obviously, there are tons of games you can play on in the Play store, but there are also loads of emulators for retro systems. It's no surprise that consoles like the Super Nintendo and Genesis are easily emulated by most Android devices, but you might not realise you can even run PlayStation One games, as well as titles for DOS, N64, PSP, and Amiga, among others. Of course, you also step into pretty murky waters, legally speaking, when you're using game ROMs, so you shouldn't download any games you don't already own, and we won't go into where you can acquire ROMs. What we will say is that there are plenty of excellent emulators, but also more than a few not so good ones, so make sure you look at the reviews before handing any money over.

Regardless of whether you're playing emulated or native games, you can greatly enhance your experience using a gamepad, and there are two ways to do this: USB or Bluetooth. If you want to connect a USB controller to your phone, you need to make sure your handset supports USB host mode, which means you can use an OTG (on the go) adapter to plug in USB devices, including external storage, mice, keyboards and, of course, gamepads. Most controllers should work just fine, including Xbox ones and those that support USB HID class. PlayStation 3 controllers will also work, but you'll need to find and install the Sixaxis Controller app from the Play store. Currently, it costs £1.64, but it's worth every penny if you like PS3 controllers, and you can download a test version for free to see if the full app will work with your phone.

The Moga Pro Power

If you'd rather go wireless, then you can use Bluetooth controllers. The Sixaxis Controller app will allow that too, if your device is rooted. There are also apps that enable you to use a Wii Remote with Android, but it's not a great controller for this purpose, so we won't go into that here.

There are also quite a few dedicated controllers on the market, made specifically for phones, with one of the most well-known brands being Moga. The firm's Moga Pro Power, for example, is similar in shape to an Xbox 360 controller, it connects via Bluetooth, and it even comes with an on-board battery to both power itself and to charge your phone. With one of these, your old phone can easily give a 3DS or PS Vita a run for their money.

Portable Storage

If you have a few old phones kicking about, then you probably have quite a bit of wasted storage capacity. 8GB here, 16GB there – it soon adds up. Rather than ignoring this potential, you can just hook it up to a PC via USB, and you have yourself a brand new (sort of), rather fancy-looking flash drive, which is also possibly expandable through SD cards. You could even connect to it wirelessly, using something like AirDroid (www.airdroid.com), whereupon that old phone becomes a basic NAS unit.

But you don't need a computer to make use of this capacity. Thanks to OTG cables, you can plug in other external storage devices and upload the data onto your phone. This could be handy if you want to quickly copy data from a flash drive, or if you take a lot of photos or record a lot of videos while out and about. If you're on holiday, for example, and the SD card in your regular stills camera fills up and you don't have a spare on you, then you could transfer everything to this old phone, and also instantly view the shots on a screen that's likely to be much more pleasant to look at than the one on the camera itself.

Portable Hotspot

Another one that could come in handy when you're away from home. By inserting a 3G (or even 4G) SIM, you can carry your own personal wi-fi hotspot with you, potentially saving loads of money by letting you avoid hotel connections and so on. Of course, your phone has to support this, but most reasonably modern ones do, so that shouldn't be a problem.

Why would you want to do it this way, though, rather than just using your current handset? Well, one good reason is battery life. Using both 3G and wi-fi at the same time will drain your battery at an alarming rate, and you don't want it running dry in the middle of an important call. You could plug it into the mains, but that makes it difficult to use for calls and naturally limits your movement.

With a separate phone, all of these problems are eliminated. You can have your old handset plugged in permanently, and you can also place it wherever the best spot is to receive a cellular reception, without worrying about having to get to it when someone calls.

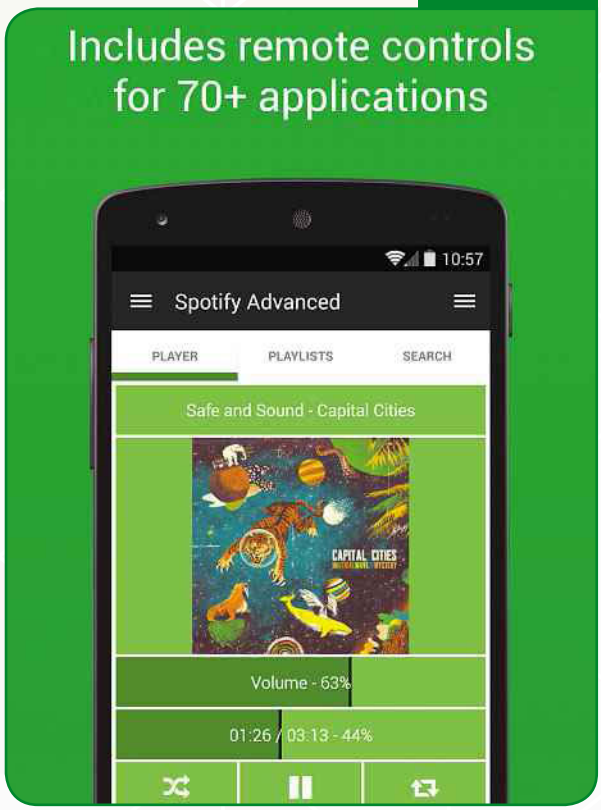
Another key advantage to this approach is that you don't have to rely on your usual network provider. You might be on a contract with O2, for example, but prefer the look and the prices of the packages from EE or some other company. Assuming your old phone is unlocked and can accept SIM cards from other networks, you can shop around and find the best deal, whether that's pay as you go or another contract. It's probably a good idea to use a comparison site such as uSwitch.com to see what kind of deal you can get.

Mini Workstation

By using your phone as a media centre or games system, you're essentially just making it function as a small PC. And just like a real PC, it can also be used for work-related tasks, such as word processing and editing spreadsheets.

Plug a mouse and keyboard into your handset (Bluetooth or USB) and hook it up to an external monitor, then all you need is the right app to have your very own portable workstation. A few years ago, there were loads of paid-for office apps in the Play store, but these days most of them are either free or subscription based. If you do want to make an outright purchase, then OfficeSuite

Unified Remote



Google Docs is simple and free

An OTG cable is recommended

Pro 8 is a powerful choice, which supports a vast number of file formats, including Microsoft's. For £6.60 (at time of writing), you can view and edit Word, Excel and PowerPoint files, and you can save locally or to various cloud services, including Google Drive and Dropbox. There are also more advanced functions, such as a PDF camera scanner.

As good as OfficeSuite Pro is, however, it's hard to recommend when there are so many free options available, including Google Docs, Docs To Go, Polaris Office and even some entries from Microsoft, such as Microsoft Office Mobile. Some of these require internet access to edit and create documents, but others don't. Either way, they're all perfectly suitable for everyday tasks.

Internet Phone

Thanks to the power of VoIP, people are able to talk to each other for free, no matter where they are in the world, just as long as they have a decent internet connection and either a computer or some other device that supports this technology. No prizes for guessing that Android phones are perfectly suited to this, and there are plenty of apps, including Skype and Viber, that will allow you to make calls over the net, using your home wi-fi connection.

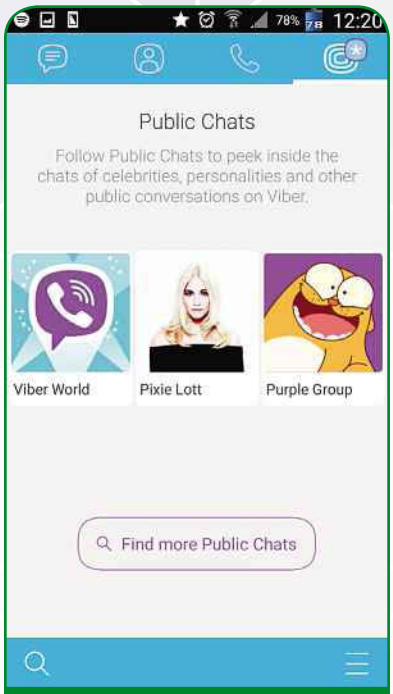
Most of the time, it would be more convenient just to use your current phone, because that's your dedicated communication device and will be the one you have in your pocket all the time. Where it might be useful to use a secondary smartphone, though, is in a multi-user scenario, such as your average family household. Rather than having personal VoIP accounts, you could set one up for your whole family. So if granny calls and she isn't fussy about who she gets hold off, she no longer needs to spend money on calling your landline; she can phone your household VoIP line instead for free. Indeed, this makes a pretty decent replacement for a traditional landline, with the added benefits of being free and allowing for video calls and file transfers.

Torrent Downloader

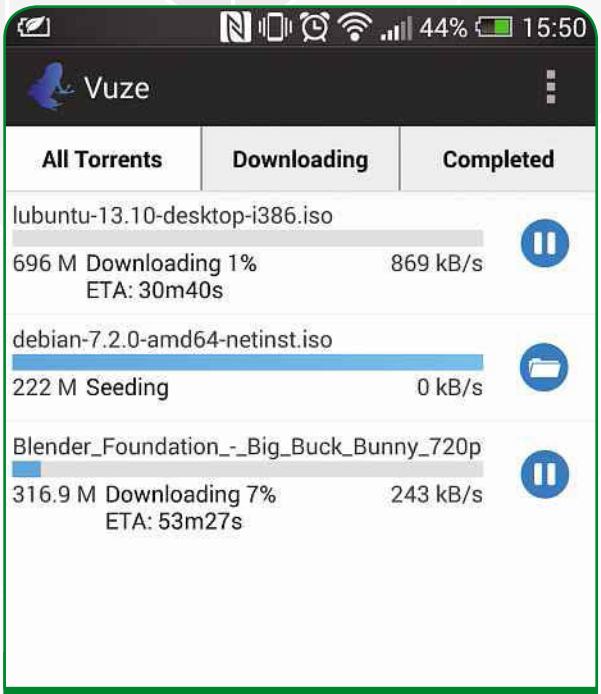
You might not like leaving your computer on all day and night, but you probably don't have any reservations about doing the same with a smartphone. That makes them perfect for torrent downloads, because you can leave them running overnight, helping you avoid traffic-shaping periods or just letting you extend your downloading time into your sleeping hours.

There are actually quite a few torrent clients for Android, including some no doubt familiar names (uTorrent and Vuze, for example), so you won't have trouble finding one. Which one you choose is a matter of personal preference, of course, so it's worth trying out a few to get the right one.

Downloading with torrents with these apps is as simple as it could be, and the biggest problem you're likely to encounter, other than running out of capacity, is speed. You're limited to a wi-fi connection (or potentially 3G, but that will expensive fast), and you're unlikely to get the kind of download speeds you do with an Ethernet connected PC, so don't expect them. What you do get, though, is convenience, and that could well be all you need to make this endeavour worth the effort.



Apps like Viber can offer you a way to make free calls



Using your phone for torrenting means you can leave it downloading overnight

VR Headset

Thanks to the Oculus Rift, virtual reality has once again found itself a firm foothold in the public's imagination. But that's an expensive option, and we don't really do expensive. No, we're more interested in Google's solution: Google Cardboard.

Google doesn't actually sell this product, but it did create it and release the design, as well development tools. For those who aren't familiar with it, it's a cardboard headset, which includes two lenses and a section for you to place a suitable smartphone. The phone will display two images side by side on its screen, but when you peer through the lenses, you see one combined, 3D picture.

In conjunction with the phone's camera, accelerometer and other built-in sensors, it makes for a surprisingly effective virtual reality experience.

One major drawback, though, is that when you're using it, your phone is in a pretty inconvenient place to make or receive calls, and if a notification comes up when you're playing a VR game, it rather breaks the illusion.

With an old handset, that obviously doesn't have to happen, plus there's also the possibility that you could improve the experience by using the spare phone as a Bluetooth-connected game controller for the one in the Cardboard.

We recommend trying out Trinus Gyre if you're interested in using your phone as a VR device for your PC. This Android app streams video from your computer, but also maps mouse movements to the accelerometer of your phone, so you can look around

in PC games by moving your head. Setting it up isn't easy, but it's worth a look if you think you have the time and patience to figure it out.

Security Camera

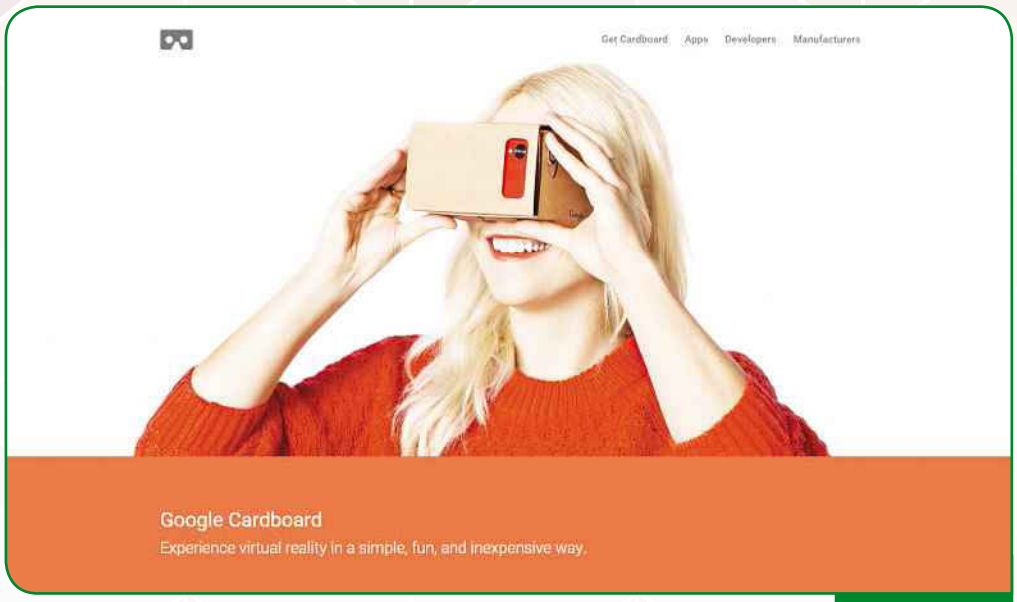
Because your average smartphone will have storage capacity and a video camera built in, they have pretty much everything they need to function as security cameras. In fact, they might even offer better quality video than a lot of dedicated units, and thanks to their internet access through wi-fi, they can even work as IP cameras, meaning you can see whatever they're seeing, no matter where you are in the world.

Of course, there's more to doing this than just putting your old phone in a corner of a room and setting it to record while you're out. You might be able to catch intruders in this way, but you're betting on there being enough recording time and that whatever unwelcome guests you have don't just steal the phone too, taking all the evidence away with them.

A far better method is to have the camera record only when it needs to and to send the images to your email or someone other internet-based location, so you can catch whoever it is in the act.

What you need is the right apps, and there are a plenty of them available in the Play store. One good one to consider is SECuRET SpyCam, which boasts motion detection abilities, which will trigger its recording, whereupon it will capture either video or images, depending on what you want, from either the front or rear camera. From there, it can email you the results, save them or upload straight to a Dropbox account. It costs £2.99 but there's a free demo version you can try first.

Another good option is IP Webcam. As the name suggests, you connect this to your home network, and then you can access it from anywhere, whether that's within your home or on the other side of the world (as long as you have an internet connection, of course). It works slightly differently to SECuRET SpyCam, because it offers continuous streaming, so you can see what's going on at any time of the day. On top of that, though, it also has motion detection and sound triggering, and many other notable features. The free version has advertising and a couple of extra features disabled, but if you want to go for the Pro edition, it'll only set you back £2.38.



▲ *Google Cardboard*

Final Thoughts

When you think about how much smartphones cost and the degree of technology packed into them, it's amazing that we change them every couple of years. Hopefully, we've been able to convince you that older phones don't have to be abandoned and can have many uses you might not have even thought of. If not, then please do trade them in or recycle them – anything other than putting them in the bin. **mm**

▼ *Give your old phone a new lease of life as part of a home security setup*

Selling And Trading

Although this article is about not selling or trading in an old handset, if do want to do that, then you have plenty of options. For a start, many networks themselves will take your old phone in part exchange for a new one, or they'll give you cash. Carphone Warehouse also does this, as do Mazuma Mobile, Sell My Mobile and more. Prices vary, as you'd expect, so it will pay to look around to get the best rates for your old devices, rather than settling on the first reasonable offer you get.

Some, but not all, of these companies also sell phones, but if you're looking to get a second-hand device, then you're not going to be short of choices. Familiar names, like Cash Generator and CeX, are worth checking out, and there are also plenty of other reliable, independent sellers. Then, of course, there's eBay, where you might be able to pick up a bargain directly from its previous owner, although for peace of mind, you might be better off buying from an eBay Shop or from Amazon Marketplace, where you have a bit more protection against unreliable or dishonest sellers.

Password Management

PC security is more important than ever before, so password management is paramount

There have been a whole lot of high-profile hacks recently, on both PC and consoles, and many of these attacks (as well as a lot of those we may never hear about) involve the theft of user data. This data includes passwords. This is a potential major issue for any PC user, as we now use passwords to secure a huge amount of information online. Think about it. You've got email, internet banking, shopping sites, gaming services, social media, online data storage and so much more. All of this is locked behind a password, which you create when you sign up for a service. Along with your username, which is still your email for many services, the password is all that's needed in order to access your data. With this information, anyone can access your email, bank, and social media, can shop online if you store payment details, and can even access your online storage. The aforementioned social media can also be a major issue, as people can pretend to be you, which can cause all sorts of problems.

Because of this, it's essential that all your online services are secure, and you may think you're perfectly fine with that usual password, but this may not be the case. If you use the same password on multiple sites (which is common, as we can only remember so many), and should this fall into the wrong hands, a good portion of your online presence could be accessed. Even if you have a strong password (more on this later), using the same one everywhere just for convenience negates this, and should someone guess just one site's login details, they'd have access to many more. Therefore, it's important to not only use good passwords, but to use multiple ones, keeping all your online services unique.

"But I can't remember different passwords for email, Facebook, banking, Amazon, cloud storage and all of my other services!" you may cry, and you certainly wouldn't be alone. In today's online age, the amount of passwords, logins, security questions and PINs we have to remember is crazy, and writing this down as a memory aid is not a good idea, lest it fall into the wrong hands. So what can you do? Well, in terms of PC and online use, you can employ the services of a password manager, a program that's designed to help you stay secure online and to take the difficulty out of remembering a multitude of passwords.

Managed Access

Some would argue that password managers have become essential security programs, just as, if not more important than anti-virus and firewalls. With recent hack activity seemingly growing at a steady rate, it's hard to argue with this assessment, and having a password manager set up can not only save you time and remove the need to

remember masses of logins, but it also boosts your online security, leading to greater peace of mind.

At their core, password managers do just that: they manage and house all your passwords, along with login details for various services. This data is encrypted and stored within the program or within an online database, and it's later accessed by the program when needed, often for the automatic filling in of forms online. You don't need to do any of this manually, you simply let the password manager do it all for you. When you first fill in data on a website's forms, the password manager will take note, storing the new details for future use so you don't have to do it again. They're both secure and convenient, although they can take a while to set up. Password managers also often have a useful feature of analysing your passwords, telling you how secure and effective they are, so you can avoid using weak passwords that may be easy to crack. Most even suggest new and secure passwords.

Initial setup of a password manager application can take a while, as you'll need to enter all your details and passwords, but the effort is more than worth it in terms of security. It's also a good idea to ensure you pick a new password for each service, if you haven't done so already.

If you already use a password manager, including browser versions, you'll need to check to see if your new manager is able to import data from your old one, otherwise you'll have a lot of data entry to do, and it could take longer to migrate than it did to set up. Luckily, most password managers have the ability to import from a number of sources, so this shouldn't be a problem. Once this setting up is done, there's the matter of the master password.

A master password is the password used to secure the actual password manager application and, as you may expect, this needs to be as secure as possible. Should anyone break this, all your details are there, ripe for the taking. So when using a password manager for the first time, you really need to pick a good, strong password. For help with this, see the Password Strength box elsewhere in this feature.

Once the password manager is set up and running with all your data, the need to enter passwords will be reduced, and eventually you'll rarely have to enter any details at all, as the manager will do it all for you. So that long list of passwords and credentials you used to need to remember is no more. Nice, eh? Certainly worth the time to set it all up.

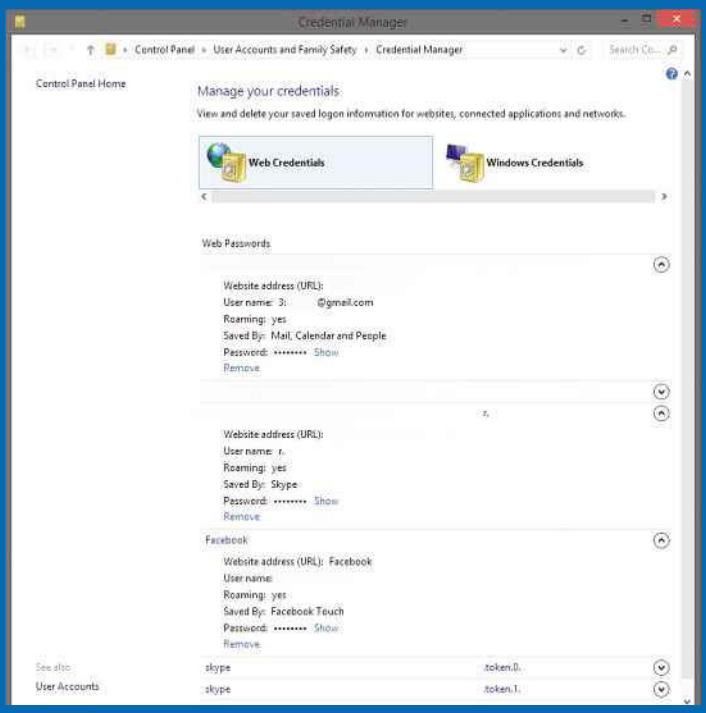
We're going to take a look at some password manager options you can find, many of which are free, but we should also look at the options you likely already have right in front of you.

Built-in Protection

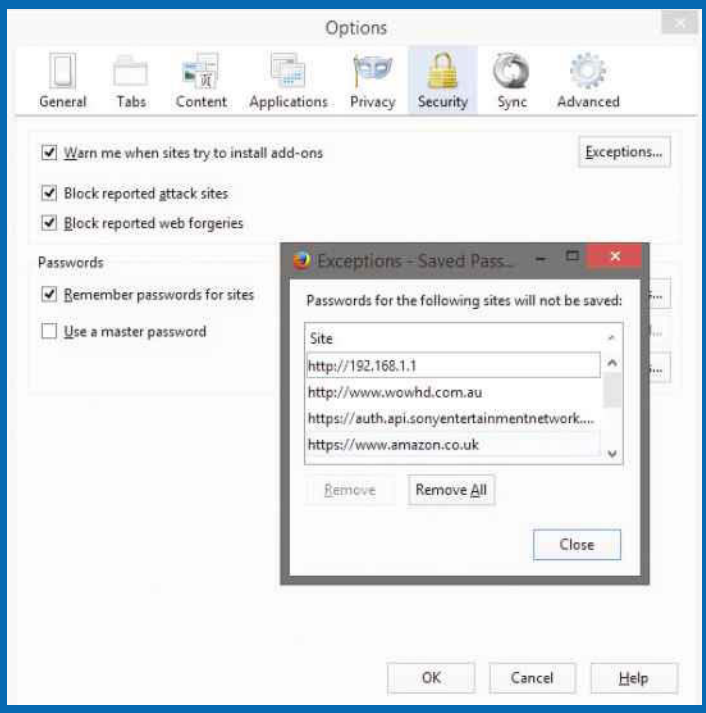
If you're a Windows user, you'll already have access to some form of password management. Windows 8's Credential Manager can store all sorts of credentials, including passwords, which can be viewed at any time to jog your memory, should you need to. The Credential Manager can store credentials for both online and local system accounts (such as details for Metro apps), and you can easily control this information, removing any you need to. It's a decent option, but like so many built-in tools, it's not the most feature packed, so you may want to consider a more specialised tool.

That said, some of the more useful and convenient options can be found in built-in form, such as the ones featured by many browsers. Firefox, for example, has the option to remember passwords and also lets you specify exceptions, so some site credentials are never remembered – useful for especially sensitive sites like banks. It can also make use of a master password, used to secure all the others, adding that all-important extra layer of protection.

Many other browsers, such as Chrome, also have password managers, and as they're your gateway to the internet, it's only fitting that these programs hold your credentials. However, if you're looking for the best level of protection, as well as more expansive features and options, you'll want to have a look at a more accomplished, dedicated program.



▲ *Windows has its own built-in password management functions*



▲ *Firefox is able to remember and secure passwords, and also utilises a master password*

Top Password Managers

Let's have a look at some of the best password managers available. These are all recommended and will all ensure your passwords are safe and secure.

LastPass

lastpass.com

LastPass is considered by many to be the best password manager around, and it's perfectly clear why. It's quite possibly the most powerful and feature-packed password manager you can find, and it comes in free and premium forms, with the free option including everything most home users could want.

As well as being able to store and use your passwords and data to fill out forms online automatically, LastPass includes some of the best security features to ensure your password collection is safe, including a two-pronged authentication, including the use of Google Authentication, YubiKey or USB devices. The latter option is a great way to secure your LastPass data, as you can turn any USB drive into a physical hardware key that can be used to unlock the program.

LastPass also features a password audit, and should a password or service become compromised, it will automatically change your password for that services, thus keeping you secure, even after an attack.

Over time, LastPass has also undergone some refining, and it now boasts a clean and very easy-to-use interface. The free version is perfect for pretty much any home user, while the paid-for version adds some advanced options, and support for mobile devices.

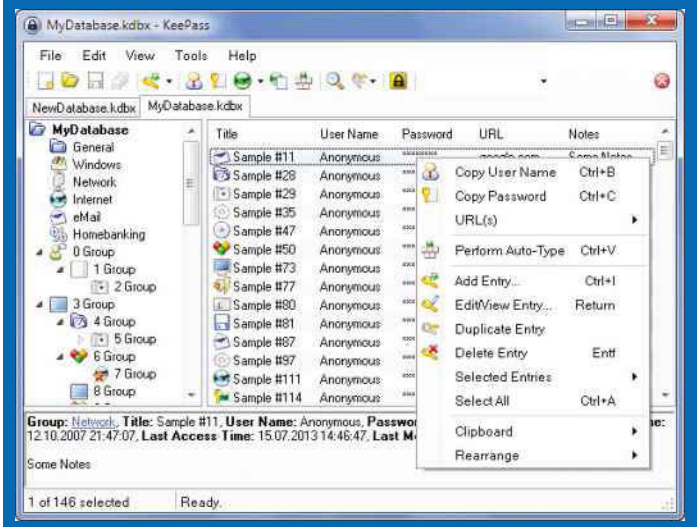
LastPass is possibly the most popular password manager avaialble

KeePass

keepass.info

Although it has a rather awkward name, KeePass is another fine password management tool, but unlike LastPass, this is an open-source application that's totally free, so you get everything the program offers without a premium cost. What's more, it may be a more appealing option for users worried about storing their passwords and personal details on a remote server (as LastPass and many others do), as it instead stores all of your data within an encrypted, local database. So you have total control, and ownership of all of your data.

Another great feature of KeePass is its portable nature, and it can be stored on any device, including USB drives, and taken with you. It'll also help to generate passwords, and the auto entry works in all windows and browsers, giving it more functionality in terms of auto form filling than many competing password managers.



KeePass is one of the best open source and free password managers

1Password

agilebits.com

1Password is another password manager that's focused on local storage, and it's also by far one of the best available, with a superb GUI that makes it very easy to use, and it has nigh-on flawless integration into any and all browsers, making it useful for just about everyone.

The password management is top notch and comes complete with a powerful password generator and suggestion system, as well as a digital wallet for banking information, secure document storage, password note functions, and much more. You can even tailor the suggested password to you, instead of using whatever random string the program's algorithm comes up with.

1Password is powerful but easy to use, and it works perfectly with all browsers

Password Strength

Choosing a password is important, regardless of where it'll be used. Whether you're securing your banking details, shopping online or simply logging into Facebook, it's always important to pick a good, solid password that no one will be able to guess. And if you're using a password manager, you must ensure the master password is as secure as can be.

Picking a good password isn't just about the number of characters and use of alphanumeric strings; it's also important to avoid picking anything that can be easily tied to you. It may be a tip that's been used over and over again, but it's very important to never use family names, such as your children, birthdays, birth places, favourite movies, books or anything else that someone could guess. All it takes is someone to carefully look through Facebook or Twitter or to dig up your personal details, and with time such passwords can be guessed.

Instead, try to pick a password that means little to you, and use words that can't be directly linked to you or your interests. As well as this, a good password should always contain both letterers and numbers, and it should be at least eight characters long – preferably longer if you want more security.

When using a password manager, it may be a good idea to let the program choose your password for you or at least use its suggestions and edit them. This way, you'll have a password that will be hard for others to guess.

The local storage will please many, but if you prefer online, 1Password also lets you do this, and you can make use of services like Dropbox to share passwords and the program's functionality across multiple devices.

1Password isn't free, but if you decide to opt for this package, it's a one-time fee and not a subscription, as used by many other password manager services.

RoboForm

www.roboform.com

One of the oldest password managers around, RoboForm specialises in password management and form completion, and it boasts a simple and intuitive interface and solid password encryption. Your data can be stored locally or synchronised to the online services, and you can take the entire program with you on a USB stick. It even supports multiple accounts, so one program can store security information for the whole family.

RoboForm has the advantage of time behind it, and as one of the oldest password managers, it's stood the test of time and has been refined over the years into a great application for password security. What's more, it's free for the first ten logins. If you need more, you'll need to purchase the RoboForm Everywhere version.

Norton Identity Safe

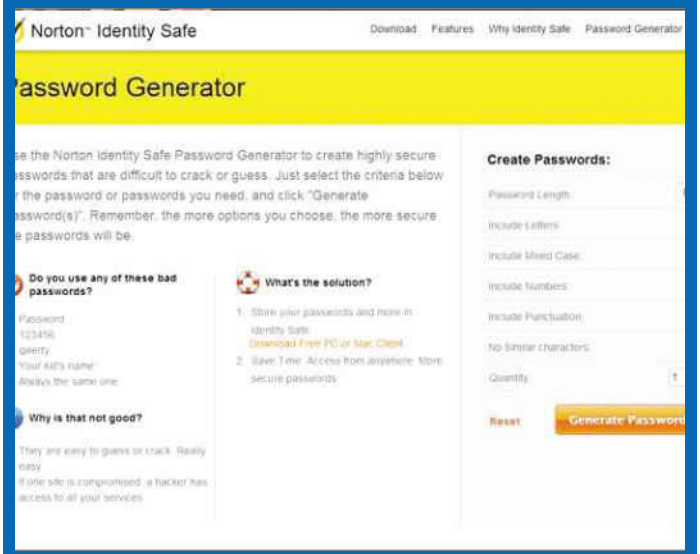
identitysafe.norton.com

Coming from the minds behind one of the world's most popular anti-virus and internet security suites, Norton Identity Safe wears its pedigree on its sleeve. This is a simple, yet very secure password management tool that can store passwords and synchronise them across multiple devices, including your PC, tablet and mobile phone. It can also warn you of any unsafe websites and is able to block potential threats, and it stores your data in a secure, encrypted online vault.

As it comes from Symantec, you may think this would be an expensive option, but you'd be wrong. Norton Password Safe is, in actual fact, free. Yes, this tool is offered gratis, and you can download and use it for nothing, which is great. There are also free mobile apps too, so you're covered, regardless of which type of device you use.

There are plenty of other password managers around for the picking, but these are some of the best, and if you're looking for a good place to start, these will all do the job and will likely become an essential applications on your PC. So don't keep your personal data or important passwords at risk any longer. Give a password manager a go. **mm**

RoboForm is one of the oldest password managers, but experience makes for a solid security product



Like many password managers, Norton Identity Safe can help generate strong passwords

ANDROID lollipop

And Material Design

David Briddock investigates what's different about Google's Android Lollipop

Recent figures confirm that these days it's Android devices that dominate the smartphone and tablet marketplace. In fact, Google's Android operating system has secured over 80% of the total smartphone space, dwarfing iPhone sales, and Android smartphone shipments for 2014 are expected to top the one billion mark. This year's sales will be equally strong.

Meanwhile, Android tablet shipments exceeded 120 million in 2013 and are far higher still for 2014. Once again, Apple's iPad came a distant second, and other platforms hardly feature at all. And to cap it all, Google's Play store now has as many apps as the Apple App Store.

New Version

But in the tech world nothing stands still. Now there's a new release to replace the previous version, 4, which was more commonly referred to as KitKat. Version 5, also known as Lollipop, is a major update, so as you'd expect, there are plenty of new features and functionality on offer.

But there's more. The user interface experience has been re-engineered from the ground up. In fact, Lollipop ushers in a brand new and radically different interface design paradigm. Google calls this new interface vision 'Material Design'.

We'll take a detailed look at Material Design shortly, but first let's investigate some of the new features in Android Lollipop.

Improved Usability

Firstly, many apps exhibit a small yet noticeable increase in performance. This is largely down to optimisations in Lollipop's new Android Runtime (ART), a 64-bit compatible replacement for the previous Dalvik implementation (see ART boxout).

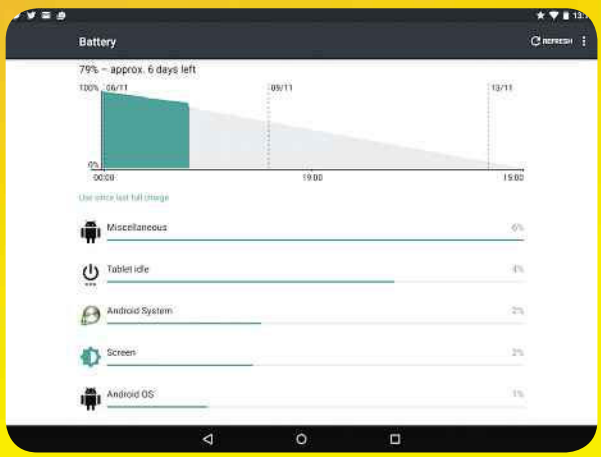
However, as far as Android games are concerned, the majority are written with the Native Development Kit (NDK). This means they use C++ libraries and pre-compiled executables instead of ART or Dalvik bytecode, so unfortunately they won't benefit directly from ART technology.

Multitasking control has also been improved. The 'Recent Apps' facility has been replaced with 'Overview', which displays all the background running apps as a card stack. It's slicker in operation and so much easier to shuffle to the app you're after.

Ever better, the 'Overview' display shows individual tasks within a single app, so if you're say in the middle of writing a Gmail email but also checking your inbox, it will display task cards for each task.

Android notification settings are applied from the Menu/Sound and Notification/App menus, rather than configuring similar settings on each separate app. In the new 'Priority' mode you can select which notifications you'll hear or see.

Fine-tuning options allow call and text notifications to be restricted to a discrete list of people. In addition, there's a 'Do Not Disturb' mode for those who wish to set aside periods of uninterrupted focus and concentration.



Battery Historian app

ART

ART is the Android runtime replacement for the previous Dalvik implementation. It's this software that runs the Java-coded Android apps.

Google wanted to provide a rebuilt foundation for the rapidly changing hardware landscape, such as eight-core CPU devices, fast growing solid-state storage capacities and ever larger amounts of memory.

Performance-centric features include Ahead-of-Time (AOT) compilation (Dalvik used a just-in-time (JIT) compilation approach). AOT compilation means that apps are pre-compiled into runtime byte-codes on installation, so instead of having to be interpreted on-the-fly, they instead act like native Android apps, optimised for the hardware.

JIT-work is very CPU intensive, but AOT needs fewer CPU cycles, which also means longer battery life. These native app translations do take up more space, but with today's low-cost storage, space this isn't an issue anymore.

ART also has a more efficient garbage collection implementation. This means it will release memory more quickly, which in turn helps performance.

The upshot is that ART delivers noticeable performance gains, sometimes two or even three times better than with Dalvik, and as Google says, "In many cases it improves performance of the device with no action required by the developer."

There's also been a number of improvements to the Java-based development and debugging environment. These will not only prove helpful to new developers but also assist existing developers port Dalvik-centric apps over to the ART model.

Battery Life

Battery life is something that everyone notices and often has a good moan about too. The good news is that Android Lollipop should extend the working duration of each battery charge.

Google developers considered the battery life impact of each core Android app, module and operating system function. See for yourself how good a job they've done by opening the new Battery Historian feature. To take maximum advantage of the new power-sipping features, switch your Lollipop device into Power Saver mode.

Security

In addition to pass codes or passwords, you can now optionally unlock a device using face recognition, namely the bio-verification 'Trusted Face' feature. Alternatively, you can unlock it with a previously paired Android device – for instance, a smartphone or smartwatch.

A more generic pairing capability allows both Bluetooth devices and NFC tags to be recognised, so just a cheap and simple wristband could be all you need to unlock any Android Lollipop gadget you own. And, of course, face recognition or dedicated device pairing is much faster than entering pass codes or passwords.

Another new security feature ensures all your data is now encrypted by default, so if your device is lost or stolen, someone needs a password to see your data. This encryption does result in a small system performance hit, but with today's multi-core processor hardware, there's invariably more than enough power to cope.

Android TV

Android Lollipop also supports TV via the Android TV service. This isn't too surprising after the popularity of Chromecast and Google's new Nexus Player (**google.com/nexus/player**). It delivers TV, films, games and so on right onto the big screen. Press the home button and you'll return to the standard Android display.

Android TV has a voice interface, so you can search for something on a smartphone when connected to the Android TV, and you'll have the option to watch the video either on Google Play or any other compatible app.

Android TV appears to have been endorsed by some big names, with offerings from Sony, Philips and Sharp, while Asus and others are promising to release Android TV compatible set-top boxes.

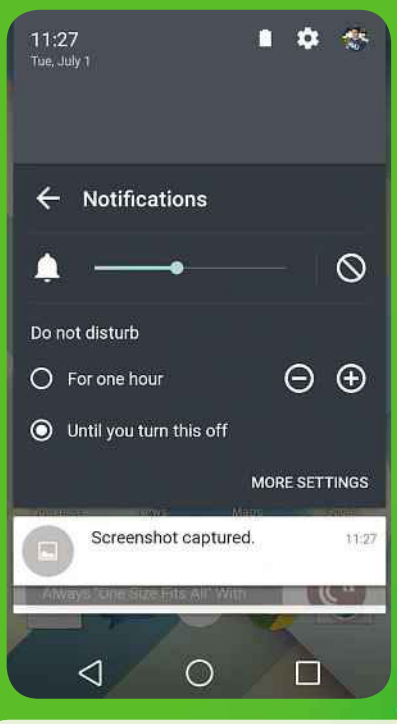
Google Chrome OS Interaction

At the 2014 Google I/O conference, Google's Android and Chrome chief, Sundar Pichai, announced an array of new features designed to consolidate the Android and Chrome OS user experiences.

For example, there's a facility to automatically unlock a Chromebook or Chromebox when your Android phone is nearby. Behind the scenes, it uses Bluetooth to access your smartphone's Google account credentials. When activated, just having your Android smartphone in your pocket means you'll be able to start immediately, avoiding a tedious manual sign on.

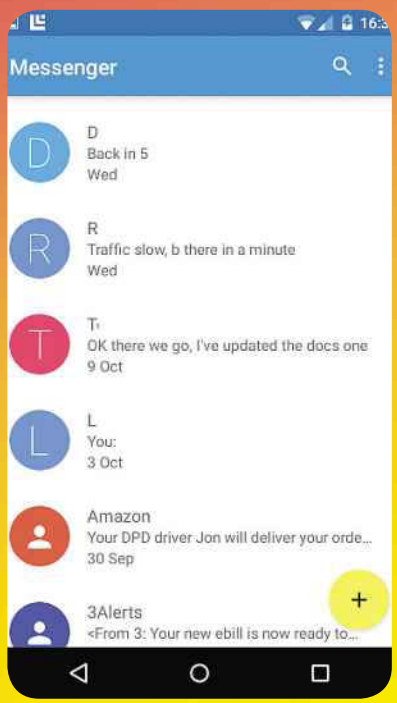
Communication events from your Android phone can appear in real-time on your Chrome OS device, so you'll see incoming calls notifications, scan text message contents or even take calls without having to continually break away from the large screen to check your smartphone. You can even see that your phone's battery is about to expire.

▼ *Do Not Disturb settings*



▼ *Theme Pack example*

▼ *Messenger app*



And an Android smartphone or tablet can act as a Chromebook or Chromebox remote control, which is particularly useful when the device is operating as an audio or video media player.

Material Design Overview

Google's goal is to develop a single underlying system that allows for a unified experience across all platforms and sizes of device. But what does 'Material' actually mean? Well, Google says Material is a metaphor for a unifying theory based on space and motion. The material itself has a tactile reality, in the same way paper and ink does, but technology adds an element of magic.

With Material Design, surfaces and edges provide familiar visual cues, but with software that makes it easy to go beyond the rules of our physical world. Lighting, colour, texture and movement all help to convey how interface objects relate to each other and interact.

Google insists that Material Design will feel more intuitive, but there's a bigger idea at play here. A Google master plan, if you like.

Material design is an attempt to remove the fragmented way Android looks today, to ensure consumers see a consistent interface and set of apps no matter which device they own.

Material Lighting & Colour

In a material environment, virtual lighting illuminates the scene, causing objects to cast shadows, both strong directional and multi-angle soft shadows via ambient lighting.

Shadows result naturally from the relative elevation (z-position) between interface objects. An object with a higher z value casts a bigger shadow.

Material can be any shape and colour. Advanced features include applying bitmaps as an alpha mask to create colour tint effects at runtime. Content, displayed on the material, can also be in any shape and colour.

In practice, all material objects have a uniform thickness dimension of one, as content doesn't increase the overall thickness.

Material Motion

Very early on, the Google design team realised motion provides meaning. Motion serves to focus attention and maintain continuity, with a subtle yet clear feedback.

This motion extends into the 3D space, so each object has x, y, and z dimensions and can move along any axis. However, typically z-axis motion is the result of user interaction.

Material can also change shape. It can grow and shrink, but not bend or fold. In addition, sheets of material can join together to become a single sheet, and when split, material can self-heal, so if a portion of material is removed from a sheet, it can become a whole sheet again.

All this means developers can create sophisticated animations for touch feedback, state changes, activity transitions and other interface events. These can be naturalistic animations with noticeably curved motion.

Many interface views, such as buttons, already have built-in animations, which are nevertheless fully customisable.

Material Design Guidelines

Such a radical new approach to interface design must be supported by clear documentation and informative tutorials. Google has stepped up to the mark with a

“Google’s Android operating system has secured over 80% of the total smartphone space”

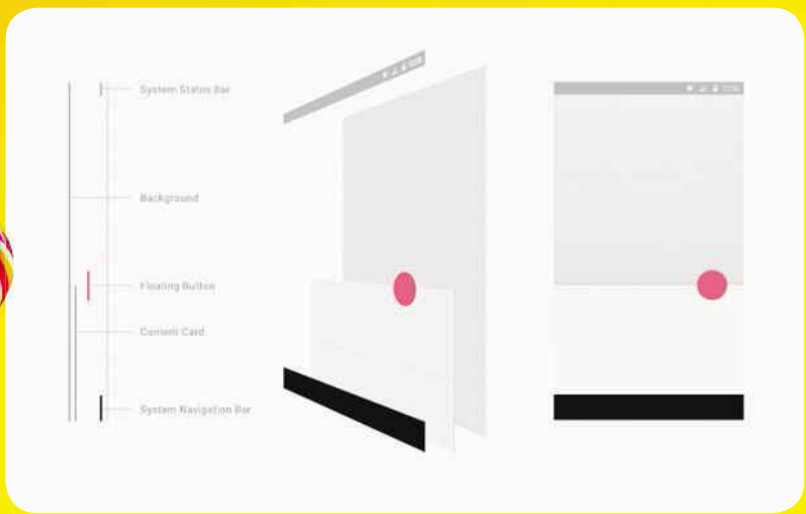
Material Design Resources

Google has posted plenty of Material Design resources online for developers and anyone interested the concepts, mechanics and appearance of Lollipop.

For example there’s a Material Design visual introduction at **google.co.uk/design/spec/material-design/introduction.html**, and a comprehensive Material Design overview at **developer.android.com/design/index.html**.

For anyone wishing to update existing apps or to create new ones, there’s a collection of Material Design tutorials at **developer.android.com/training/material/index.html**.

▼ *Material Design 3D Layers*



comprehensive guide for visual, motion and interaction design across platforms and devices, so anyone can use material design in their Android apps by following these guidelines.

Android 5.0 (API level 21) and above embody new components and functionality. New elements include a theme, widgets for complex views, plus APIs for custom shadows and animations.

The dark and light material themes provide styles for apps and system widgets, but developers can set their own colour palette and specify default animations for touch feedback and activity transitions.

Android 5.0 provides two new card and list widgets with material design styles and animations. The newCardView widget displays important pieces of information with a consistent look and feel, while the newRecyclerView widget is an enhanced ListView that supports various layout types and has snappier performance.

Teething Troubles

With such a major update, it’s no surprise that early adopters found a few teething troubles. Early complaints included sluggish video performance, random crashes and virtual keyboard problems.

As you might expect, installing Lollipop on older devices with slower CPUs and less advanced graphics cards resulted in a non-optimal experience. However, even Google’s own Nexus 5 smartphone suffered a serious wi-fi issue, which also caused battery life problems.

A more serious long-term issue is related to the new Android Runtime. To ensure faultless operation and to take full advantage of the enhancements, Dalvik apps need to be optimised for ART. So apps written for earlier versions of Android, and therefore older Dalvik implementations, may suffer problems. Problems that include crashes, which could result in losing your unsaved data or games status. In fact, in some cases it caused the Android OS to fail, requiring a full reboot.

This isn’t a two-minute code fix for an app developer. In fact, for a large and complex app, it may involve months of code changes and retesting, and of course, developers will still need to support Android devices running Dalvik, so now they have two completely different target execution environments.

Even now, it’s not clear how many of Google’s own apps have been optimised, let alone the millions of third-party Android apps.

Lollipop Updates

The good news is a 5.0.1 update in December 2014 did fix quite a few problems, and there’s been a steady flow of Lollipop-ready app updates at the end of 2014 and start of 2015.

Consequently, recent Android Lollipop blog postings and social commentary have been much more favourable; some owners appear to have enjoyed a 30% improvement in battery life since upgrading from KitKat and, as I write, it appears Lollipop 5.1 is due soon.

So the future of Android is already here, and regardless of these initial problems, there’s no going back. Lollipop, with its new look Material Design and enhanced Android Runtime, is here to stay.

In fact, indications suggest many of Material Design concepts are highly likely to appear in a future version of Google’s Chrome operating system, so we may well see a Lollipop-like user interface experience appear on those value-for-money Chromebook laptops and Chromebox desktops. **mm**

Social Media Apps For Android

Get busy with your online social life as Keir Thomas looks at five intriguingly useful tools

Social media has changed our lives, and its rise has mirrored that of widespread mobile devices. Nowadays you'll struggle to find a phone or tablet that isn't tuned into Facebook and/or Twitter in some capacity. And that's the topic for this week's group test, wherein we look at apps that provide access to social media or that bring interesting new functionality. With one exception, we're not interested in the official clients (why review something you already know about?), and instead we're interested here in what third-party efforts can bring to the table.

As usual, all the apps below are available in Google Play and were reviewed on a phone and tablet running Android 4.3 Jelly Bean.

Facebook Home

The page in the history book for Facebook's experimental Home app is still being scribbled, and until then, the app remains available in Google Play. The last update was in December last year, and Facebook recently switched to a two-week update cycle for its key apps. So whether Home yet qualifies as abandonware is open to debate.

> **"The page in the history book for Facebook's experimental Home app is still being scribbled"**

To remind you in case you missed the extensive coverage a few years ago, Home is an Android-exclusive app that came pre-installed on several phones from HTC and Samsung, as well as being offered in Google Play. Sadly, these phones proved a little less popular than desired by Mr Zuckerberg. This was widely believed to be because of how Home works – it turns the phone's lockscreen into a social media dashboard. It'll optionally take over your launcher too. The consensus appeared to be that Home was a nice idea, but people didn't really want social media pushed against their noses in such a way.

However, to Facebook's credit, Home isn't just about its own service, and it also lets you follow friends on Instagram, Tumblr, Pinterest and Flickr (but not arch rival Twitter – Facebook ain't that generous).

There's a reason the app is an Android exclusive, and that's because this kind of thing is impossible on Apple iOS. In fact, technically speaking Home isn't even compatible with all Android phones – support is limited to older Samsung, Nexus and HTC models. Sorry, Sony fans! Home is not available for tablets at all. However, you're allowed to install it on any phone. Facebook just doesn't guarantee it'll work.

What surprised us most about Home is how simple it is and how well designed

too. It simply shows social media notifications and updates at the lock screen. As such, it attempts to shift the paradigm of how we use our devices and social media.

Swipe left on the lock screen and you can see updates from friends. Swipe right and a camera appears for quick snapshots that you can then optionally upload to your social media services (although strangely there's no option to automatically upload to Facebook). The Settings panel lets you alter the lockscreen wallpaper so that you can see pics you've taken and put on Facebook, or pics of your significant other (if you've told Facebook who this is), pics of your family (ditto), pics of your close friends, and simply pics of your FB friends – whoever they may be. Smaller pics are scaled to full screen pretty messily and this is also an issue when viewing updates from your friends – pictures are dynamically zoomed and panned in the background, and most of the time you'll see the ugly JPEG artefacts.

A key feature missing, at least on our test setup, was the inability to set up a PIN or other type of lockscreen protection. This is a mind-blowing omission. It's called a lockscreen for a reason!

Facebook Home has all the hallmarks of a superb app. It looks great and on paper is a great idea. However, it's answering a question nobody has asked, which is: How can I have instant access to Facebook? Even if you're such an immense Facebook fan that you might ask such a question, the answer provided surely can't compromise security and privacy like Home does.

Hootsuite

Favoured by the social media intelligentsia, Hootsuite lets you unify access and posting to your social networks, whether that be Facebook (including Pages), Twitter or LinkedIn. You're also able to check in to Foursquare, the location-based social networking service.

Unfortunately, resurfacing immediately was the same problem we had when reviewing the app last week in our equivalent iOS group test: although we could log in with Facebook, we weren't able to post anything or view our wall or feeds. We suspect this is because we have two-factor authentication activated on Facebook, an additional security measure, but this is hardly unusual nowadays.

This technical difficulty shows up Hootsuite for what it is: a third-party client that's limited to what Facebook, Twitter or LinkedIn allow it to do via their programmer interfaces (APIs). Things can break easily. That said, Hootsuite clearly sees it outsider status as no hindrance. Alongside the ability to post to all your social networks at the same time, you can also schedule postings to take place at some point in the future. This is arguably the strength of the app for many people, and Hootsuite talks of 'managing brands' via Facebook Pages. The clever PR person can queue up postings on a Monday morning and never look at their Pages again until the following week.

The app works on a tablet but during setup switched between portrait and landscape settings so much that it made us dizzy. We suspect that, as with so many Android apps, Hootsuite treats a tablet as if it's a large phone. There was certainly no visual difference between the phone and tablet interface layouts in our tests, and the design was overall sparse and basic. You simply tap on a heading to see postings – Home Feed, Mentions, Direct Messages and Sent for Twitter, for example. Notably and rather strangely, there's no way to mix and match feeds. The ability to read your Twitter and Facebook updates in one long list is an obvious need, but you won't find it in Hootsuite; you must look at each consecutively. And if you're going to do that, you may as well use the default apps for each service, which offer a superior look and feel, as well as full access.

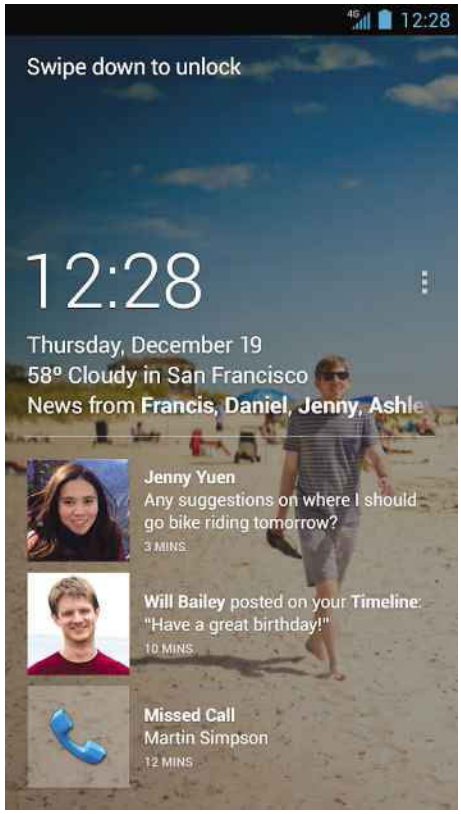
Composing is similarly basic, with the ability to attach images and add a check-in location via GPS. A drop-down menu at the top right of the screen allows you to select which of your social networks you want to post to.

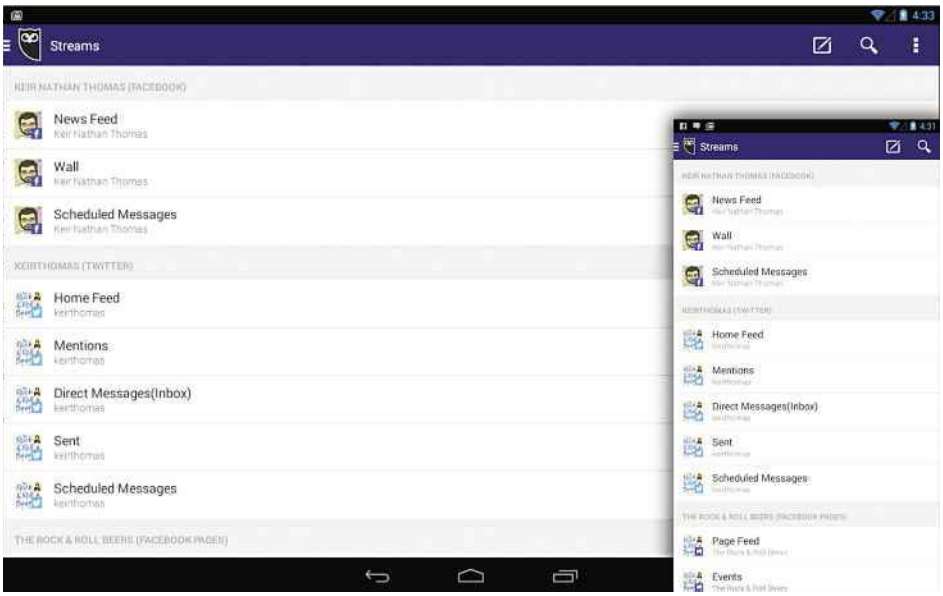
Ultimately, Hootsuite does one thing well, and a few other things in a fairly basic way. That said, the ability to scheduling postings is useful and for some reason not found in the official client apps.

Socially

Like all social network sites, Facebook has its own livery in the form of specific colours and fonts, and it's perhaps not surprising that one of the biggest markets for third-

All the clever design in the world can't make Facebook Home into more than a white elephant





Hootsuite lets you schedule social media postings so they appear in the future

party add-ons is in personalising the service – theming the interface or turning off annoying aspects. Socially focuses on the latter, otherwise referring to itself as a fully fledged Facebook client.

Once again this is an app designed for phones that looks odd and stretched out on a tablet display to the extent of barely being usable. On a phone, however, it looks pretty good, and three levels of customisation are offered: you can add a wallpaper background, which also tints the colour scheme to match, or change the colour tone on its own, and a separate control panel lets you change the font, as well as font size and colour. Perhaps usefully, you can also apply the wallpaper or colour you choose to the entire device as launcher wallpaper.

Socially provides access to most but not all aspects of Facebook. You can look up your friends, view notifications, read and send messages, view photo albums and make postings. But noticeably missing from that group is the ability to manage your Facebook Groups or Pages. This isn't a tool for 'pro' Facebookers managing the social presence of a business. Then again, even Facebook's own apps aren't stellar in this department – but at least the functionality is present.

Unfortunately, Socially appeared to have a serious issue in our test in that it simply didn't reflect what we were seeing on the Facebook website or in the Facebook app. There are two ways of seeing updates on Facebook: sorting by most recent or by most popular. Socially appears to use some other method. On its list as I write are stories from 17 minutes ago, and 31 minutes, one hour, two hours, three hours, four hours and so on. On Facebook's page online only a handful of stories were even over an hour old. Our first thought was that Socially tunes into the mobile version of Facebook – m.facebook.com – but even that was different when compared side by side with Socially. Curious.

So in Socially we have an app that lets you make Facebook look pretty, which is to be admired, but that might have trouble delivering the basic content – although our problems could be unique to the account we used for testing. The rather intrusive always-seen ad at the bottom of the screen tips us over the edge, however, and made it so we really can't recommend this app.

UberSocial

If you're going to build a third-party client for a popular social network, then it's essential to add something new to the mix. UberSocial is a fine example for Twitter that provides a paradigm others might follow.

In addition to a standard Timeline view showing tweets from your friends, along with Direct Messages, Retweets, Trends (that is, hashtags) and Mentions headings, you can select to filter your feed by those

A somewhat bizarre obsession with older stories means Socially can't be recommended as a Facebook client

UberSocial is everything the official Twitter app should have been: fast and feature packed

that contain videos and also filter according to an Inner Circle of people you actually want to hear from (as opposed to all those people you friended out of politeness – don't worry, we all do it). The Inner Cirlce particular heading also contains a count of tweets, so you can see when new stuff pops up.

As if that weren't enough, UberSocial can also lock onto your GPS coordinates (if your device features the functionality) and show you Nearby Tweets, which are tweets geotagged as originating from somewhere near to you. All these options are presented on the UberBar, which runs across the top of a phone when held in portrait orientation, and are limited to the left-hand quarter of the screen on a tablet in landscape. Yes, this is one of those rare Android apps also designed for tablet use. On both tablet and phone you drag the UberBar left and right to reveal more options, while tapping a tweet opens any URL it contains for viewing within a built-in web browser. This browser is what occupies the remaining three quarters of the screen on a tablet, although on a phone, the list of tweets is simply shifted out of the way so you can view the page.

Composing a tweet is mercifully simple, with a character counter at the top right and the ability to add in photos and video or your geotag your location by tapping the relevant button. You can also simultaneously post to Facebook, and this is perhaps one of the most surprising aspects of UberSocial – it's not just about Twitter. You can view your Facebook feed and comment on postings from others. Compared to dedicated Facebook apps it's a bit primitive (you can't even view your photo albums, for example, never mind manage Pages or Groups), but if Twitter is your main means of social networking and you like to check Facebook occasionally, then it more than suffices.

UberSocial is pretty quick in everyday use, and ultimately we're left thinking this is the Twitter app that Twitter should've produced. A superb notifications system whereby the gist of tweets is shown at the top of the screen while you're using other apps is just the icing on the cake. There's still room for improvement – it'd be terrific to be able to schedule postings, for example – but there's simply a lot to like here. Income is generated for the developers via a somewhat intrusive always-visible ad at the bottom of the screen, along with occasional full-screen ads. A Pro version removes the ads and will set you back just over £3, which seems like a reasonable price to us for what you get.

ProStatus

It's fair to say that some people like to post on social networks more than others, and ProStatus is an app to designed to make their lives easier. It lets you post to Facebook, Twitter and Google+ simultaneously, including posting photos and also lets you schedule posts.

First things first, however, and although we had no issues logging into Facebook and Google+, attempting to do so with Twitter resulted in the same error on both our phone and tablet. We have the maximum security turned on with all our accounts, including two-factor authentication, and this may have caused the problem. Alternatively, it could be a problem with the Twitter API, which only allows a certain number of third-party client connections. Either way, it's annoying, although your experience may vary.

Once the app's up and running, the interface splits into two halves: Archive and Scheduled. The first shows cards listing ready-made postings, which you can use repeatedly (although there's also an option within Settings to delete them upon use). These cards can be coloured to aid recognition, and tapping any opens it for viewing and editing. The Scheduled heading is almost identical in nature but, as you might expect, shows postings that have been scheduled.

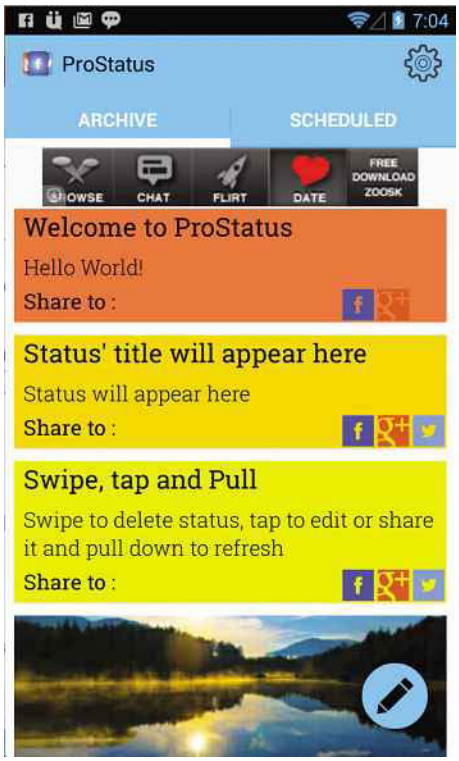
At the bottom right of each view is a pencil icon that lets you compose new postings, and there's nothing complicated to navigate – you type at the top of the screen, attach photos beneath if you wish, then select which of your networks you want the posting to appear on. At the bottom you can select to schedule the posting or add it to the archive, while tapping the button at the top right shares the posting immediately. A letter counter appears to the right of the text entry field, but we saw no complaints when we surpassed the magical 140-character limit. Because we were unable to sign in with Twitter, we don't know how the app handles this, but we'd guess it splits the text across multiple postings.

Missing from the compose screen are the ability to tag others or to geotag. Automatic URL shortening would have been nice too.

If you want to view your social media feeds, then you're out of luck, because ProStatus is about posting and nothing else.

Adverts are visible all the time, and you can remove them for just 69p. Sadly, the app doesn't have a tablet mode and merely stretches the interface to fit, which looks silly although is functional.

ProStatus does one thing and does it well. The inability to tie into other social networks like LinkedIn is a notable omission, but if your work involves posting to the 'big three' on a regular basis, then ProStatus is well worth a look. **mm**



ProStatus does one thing only: post to Facebook, Twitter and/or Google+, either using ready written messages or by scheduling

"It's fair to say that some people like to post on social networks more than others, and ProStatus is an app to designed to make their lives easier"

Remembering...
Doom

Despite the restraining order, **David Hayward** still follows John Romero around with his iconic game

The early 90s saw some great games appear on the PC, and one in particular took the gaming world by storm: *Doom*.

Doom was iconic in many ways. For a start, it was the title that really kicked of the first-person shooter genre, and you could get hold of the first third of the game through the BBSs (bulletin board systems) of the time as shareware. It was also quite controversial, with its blood, guts, killing and of course the satanic imagery that developed throughout the many levels. Needless to say, more conservative members of the public took to denouncing it. The rest of us, though, didn't really care and loved the game to bits.

v was iconic on a more personal level for me. I recall turning up for an interview for a techie post, having just rushed out from college and missing the train. I turned up at the interview all flustered and had one of the worst face-to-face interviews of my life. After that, me and the other applicants were tasked with networking several machines and proving that the network we made was sound.

Being a little off to begin with, I decided to dig out the copy of *Doom* I had in my college bag and installed it on the PCs I networked. The result was me, the supervisor, director of IT, HR manager and senior technician playing *Doom* for over two hours. In my eyes, I got the job thanks to *Doom*.

Its History

Doom was uploaded to the Software Creations BBS on 10th December 1993. Developed by id Software and programmed/designed by John Romero, John Carmack and a host of other equally talented visionaries, *Doom* found almost instant fame and very quickly became the game that id Software later announced as "The number one cause of decreased productivity in business around the world."

Distribution of the first third of the game as shareware made sure that the game was played by millions; the rest of the game could then be purchased, which obviously unlocked the remaining two thirds.

The groundwork for *Doom*, though, was pretty much already in place, through id Software's previous game, *Wolfenstein 3D*. The game and environment engine was then reworked, with added height, improved graphics and the addition of more dynamic features such as platforms, hidden areas and other such sections of the individual levels. When combined, of course, the key ingredients made for an exceptional and highly addictive game.

Another element that made *Doom* such a well-played game was the use of the modular data files, called WADs (Where's All the Data, apparently). A WAD could be unpacked, and the user could then import their own graphics, level designs and even sound effects. Once done, the user could repack the files into the WAD and play the game with their own custom enhancements.

A year later, *Doom II: Hell on Earth* was released, and we got to wield the double-barrelled shotgun and John Romero's head on a stick behind the final demon. And around ten years after that, I think, *Doom 3* was released, with much improved graphics and engine.

The Good

Networking several machines and playing *Doom* against your mates. Sheer 90s bliss. And of course, being able to customise the game.

The Bad

Not getting your work done on time. Getting caught playing network *Doom* instead of working.

Conclusion

id Software, John Romero and John Carmack, we salute you. Thank you for an ace game.

Did You Know...

- If you played the demonic voice at the end of *Doom II* backwards, it says "To win the game you must kill me, John Romero!"
- Bill Gates appeared in video where he's actually inside a *Doom* level.
- Some companies formed policies to detract its employees from playing *Doom* on their networks.
- The BFH was originally supposed to stand for Blast Frequency Gun 9000. However, its other meaning soon took over.
- I once met John Romero and tried to beat him at network *Doom*. I lost.

With nothing but your trusty pistol, you take on the hordes of Hell

Those horrible pink demons were enough to give you nightmares

The Things That Frustrate Us About... Internet Explorer

It might feel like an easy target, but when you're forced to use Internet Explorer it can really get on your nerves

There are some programs and some companies that could start handing out free puppies and chocolate bars and people would still hate them. Internet Explorer (IE) seems to be one of those programs. Yes, in the past, there were lots of things wrong with it, and compared to newer browsers it seemed clunky, awkward, and even sometimes unsafe.

In recent times, Microsoft has made an effort to overcome some of the long-held prejudices people harbour towards IE, and recent incarnations are very different from the Explorer of old. At this point, it's even got most of the features you love Firefox or Chrome for. Still, ask almost anyone who uses the internet a lot for work or pleasure and you'll find a rich seam of resentment towards Microsoft's once-dominant browser. So why do we hate it so much? Well…

Argh! Broken Websites!

Ever come across a swish-looking website that then doesn't look quite as swish when you're using Internet Explorer? That's probably because Microsoft doesn't always concern itself much with web standards; in fact, in the past it's been openly hostile to standards of the World Wide Web Consortium.

That's annoying, especially if you have to browse with IE on a work computer. It's even more annoying for developers, though, who often find their beautifully rendered websites just look crap in Internet Explorer.

Fix it: In fairness to Microsoft, it's been working on it. Even now, though, the HTML5 test site (**html5.test.com**) shows that IE 11 scores just 336 out of a possible 555 points. By comparison, the latest version of Chrome scores 501. So IE still has some catching up to do, and if you're a web developer, you're going to need to test your sites in the browser before launching them if you want everyone to get the best experience. Sorry.

Eeek! How Secure Is IE?

That is a bit like asking how long a piece of string is, because it depends what version you're running and on what operating system. The older the OS and the older the browser, the less secure it's going to be.

That's worrying because surveys keep telling us many businesses are reluctant to upgrade their systems, and don't let employees install alternative browsers. Later versions of IE are more secure, but even last year we were seeing security firms warning people to switch browsers because Microsoft was reacting slowly to vulnerabilities.

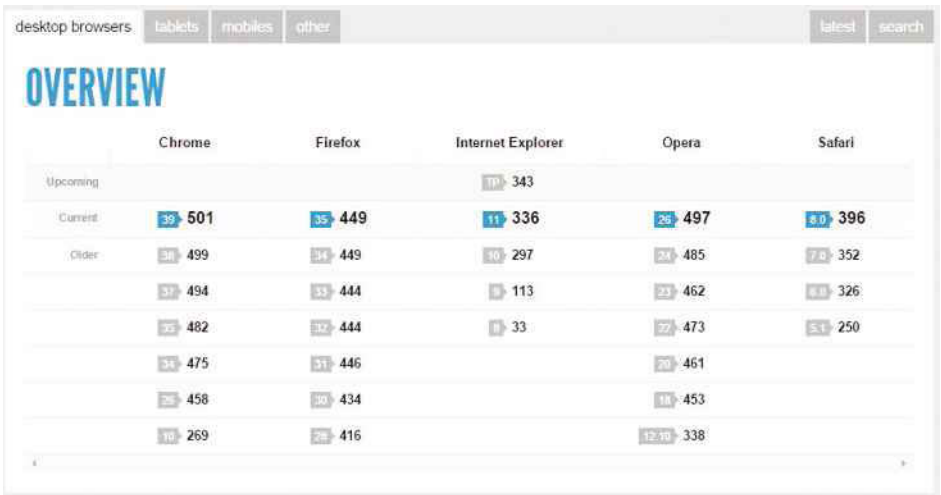
Fix it: If you're concerned, the obvious thing to do is switch browsers. If that's not practical, though, at least make sure you're running some decent anti-malware software.

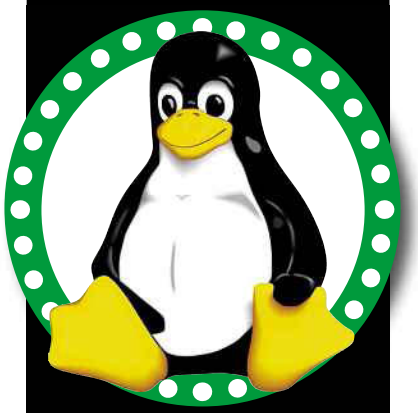
Bah. It's Just So Pushy!

This is an annoying hangover from the bad old days when Microsoft was doing it's best to make sure IE was the only browser in town. Many that remember the times when Internet Explorer was bundled with PCs, and was thus the default browser, are still resentful.

Even now, if you open IE for some reason, it'll still ask you to make it your default browser. In fairness, lots of programs will ask you if you want them to be your default whatever, but somehow it's more irritating when IE does it.

Fix it: Install something else, and be decisive about clicking no. No, you can't be my default browser, Internet Explorer, and that's the end of it. **mm**





Keeping Your Kit Alive

How far can we stretch old hardware?

David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

I wrote an article for Micro Mart the other week, Old Hardware Still In Use, about computers from the 70s, 80s and even one from the 40s, which are still in active use and serving organisations and companies as well as they did when they still smelt of the packaging they arrived in.

The article, though, wasn't so much about the age of these machines; it was really about how much we, today, seem to go through hardware like nobody's business. As I said in the body of the article, these things were made to last, and if the vast majority of users are only using their machines for browsing the web, going on Facebook, watching YouTube clips and maybe some very light gaming at best, then why do they need a £500-plus computer?

This is where Linux comes into its own. We all know you can install a copy of Ubuntu, Mint, Arch or one of hundreds of other distros on a PC with very modest hardware, but I'm wondering how many out there don't realise this.

True, there's a slight learning curve when it comes to using Linux, but for the sake of the user who just uses a PC to surf, type out a few emails and so on, there's little need to get behind the scenes of the OS and learn every command line instance going.

So it got me thinking. Wouldn't it be novel for a supplier to sell refurbished, older hardware? Kit that's still good enough to run a decent modern(ish) distro, without costing an arm and a leg. Maybe something like an early Hyper-Threaded Intel chip, on a reasonably good board? Or maybe the older AMD FX processors when they first came out? Heck, you could even go further back and take advantage of the last generation of MMX processors.

It also made me wonder what you have up and running these days? Do you have any old hardware that's still going strong and runs a Linux version? If so, then what's the hardware, what distro do you use, and what do you use it for?

Out With The New And In With The Old

I suppose if you were to try out an older system with Puppy Linux or something, then the classifieds section of Micro Mart may be a good start or better yet, flea bay. But I did think what about offering to buy ex-hardware from schools or colleges?

Most of education buy in new hardware every year and often salvage what they can from the machines that are being put out to pasture. Is it okay for members of the public to approach them and ask if they have anything for sale? Surely a little extra cash from the sale of old hardware will help the school kitty? Even if it goes toward a few bottles of something nice for the dinner ladies at Christmas time. Again, I don't know.

I do games and hardware reviews, so in my case a modern PC helps me with my job, as does running Windows 7. Linux, although great, has been sidelined to a virtual machine as the majority of my work involves true Windows and not a virtualised version.

I may get around to buying some old hardware one day and seeing if it's possible. I also want a BBC Micro too, though. Maybe one day…

Can an older PC with Linux installed still be of use in today's world?

The Amiga Years

Sven Harvey catches up with some news

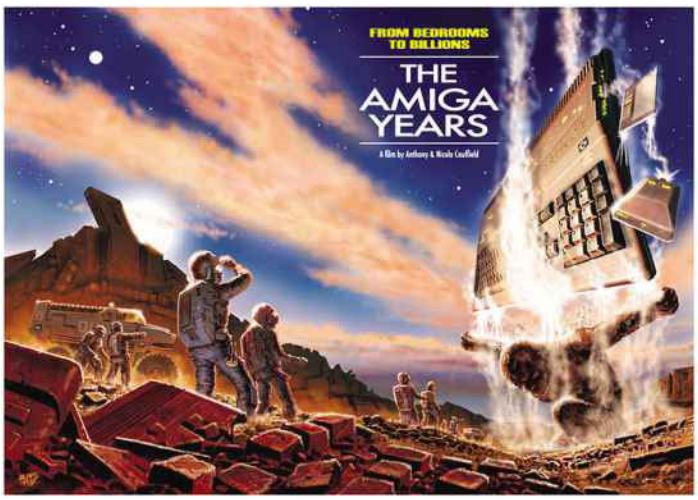
Anthony and Nicola Caulfield , who had success with a Kickstarter campaign for 'From Bedrooms To Billions', have announced a new Kickstarter campaign for a new documentary film as a follow-up, entitled 'From Bedrooms To Billions: The Amiga Years!'

The original film will be available to the general public to buy as a digital download, DVD or Blu-ray shortly, and guides the viewer from the start of the computer and videogames industry to the present but with a heavy emphasis on the 8-bit years (from 1979) and looking at it all from the point of view of the UK's leadership in the field of home computer games and the market it developed into. You can find out more about the first 150-minute film at **www.frombedroomstobillions.com**.

The new campaign is to fund the production of a new 90-minute documentary focusing on the developments in the computer and videogames industry from 1985 to 1994 – the main years of Commodore's Amiga from launch until the vast majority of its development community made the move to Sony's PlayStation. The film makers will be recording a whole new series of interviews to allow them to chart the story of the Amiga and its peers, from development to launch, and the key developers and games that made the format so important to the way videogames production, especially in the UK, developed. The film will also look at the development of the demo scene as the initial skills honed in the 8-bit programming environments developed into the more powerful 16- and 32-bit era with graphical upgrades alongside. I would personally expect the likes of Deluxe Paint and Lightwave to get major mentions.

Equally, musicians found more tools and higher capabilities to create on the new formats as music became more realistic and rounded in the days prior to full CD-soundtracks in games. Interviews with musicians will explore some of the iconic soundtracks to games from the era. Interviews with journalists will also reveal another side of the era where writers who had been consumers and enthusiasts at the dawn of the 8-bit gaming era led the magazines that brought news of developments with more enthusiasm than other quarters of the press while reviewing games that are now legends.

The download version of the film is available from the first pledge level of £10 on the Kickstarter (I think I'll be going for the Blu-ray myself), which you can find at **goo.gl/ugdbfc**.



Super Stardust Ultra

With Housemarque busy with DLC for *Resogun* and further up and coming titles, Cheshire-based d3t, a Sony Computer Entertainment Europe contractor linked to SCEE through SCE XDEV, has completed a conversion of *Super Stardust* to the PS4, based on the PS3 version, which was, in turn, based on the Amiga 1200 and Amiga CD32 game.

Super Stardust Ultra retains all the features of the base *Super Stardust HD* game on the PS3 but is enhanced with new modes and some new planets without it getting in the way of the award winning gameplay mechanic, which is of course based on *Asteroids* but with twin stick controls (left for movement and right for firing direction.) The game runs at 60 frames per second in 1080p resolution (unlike so many games) and is one of very few PS4 games that function in stereoscopic 3D on 3D TVs. Rather more interesting, however, is that the game is referred to as 'Project Morpheus Ready', which makes sense as it covers the technical bases for the VR headset and could produce a very interesting VR experience. The game is currently available on the PlayStation Store for £9.99 on PS4.

Amiga Mart On Facebook

You can find a Facebook page for Amiga Mart with links and the like at **www.facebook.com/AmigaMart** – see you there!

Sven Harvey has been our Amiga specialist for over 15 years drawing on his 24 years retailing computer and videogames (25 Christmases, no less) and even longer writing about them.

Galaxy Quest

Ian McGurren investigates two mystery objects approaching

Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

It's that time of year again (well, that time of the year for the Android fanbase): the Mobile World Congress expo and the unveiling of arguably the leading Android device, Samsung's new Galaxy S.

Off to a bit of a slow start, the original Galaxy S was released in 2010 against the then-dominant iPhone 3GS / 4 and made its mark with a superb AMOLED screen and also looking suspiciously like the aforementioned devices. Things picked up with the Galaxy S2, the first flagship to begin to offer the iPhone some actual opposition, a position cemented with 2012's Galaxy S3, a phone still available – and usable – today. At this point, Samsung seemed to be going from strength to strength, but the Galaxy S4 wasn't met with the same acclaim, with many claiming it too close to the S3. Spec and sales plateauing really bit, however, with the S5 arguably the least well received S series device since the original. Barely distinguishable from the S4 visually, were it an Apple, it would have been that year's 'S' revision.

And so to 2015 and the new Galaxy S – or Ss, plural, as there's not one Galaxy S6, but two. More on that later, though; lets look at the 'basic' S6.

First thing you notice is the front still bears the same design hallmarks as the Galaxy S3/4/5. The body, however, resembles another well-known, non-Android smartphone, with curved metal sides, small charging port and tiny speaker holes. But Samsung would not be pleased to think of the Galaxy S6 as the result of a late night fumble between a Galaxy S4 and an iPhone 6, no no... That's not to say it isn't attractive, as this is its most attractive device since the S2 with bevelled glass and gorgeous colours. The glass back, however, didn't work on the iPhone 4 or the Nexus 4, and chances are it won't work here either.

The S6 is the first S device to no longer feature a removable back or battery, something introduced with 2014's Galaxy Alpha designer device. The company points to wireless induction charging and fast charging as the upside of this, and 10 minutes for a four-hour charge isn't to be sniffed at, nor is the 11-hour talk time.

The screen takes an unsurprising turn to the QHD side, while still remaining at 5.1 inches and hewed from finest AMOLED, giving a very healthy 577ppi density, pretty much flooring the competition. Whether they've finally nailed pure white on AMOLED is yet to be seen, though.

Hardware-wise, Samsung is tight lipped as to the full spec. All that is known is that it's a 64 bit octo-core Exynos chipset for the international LTE model (the one we will get in the UK), and the device will come with 32, 64 or 128GB storage. That last part is especially notable, as not only is the battery non-removable, there is no micro-SD card slot either.

And so to the S6 Edge. Those of you familiar with Samsung's line may recall a curio released at the end of 2014, the Note Edge. As the name suggested, the Note Edge took the Note 4 and added an edge, literally, in the form of a curved OLED screen. This right-hand edge screen functioned as an additional form of interactive screen that would work in conjunction with the OS, like a Twitter feed ticker, for example. It was seen as a test run and was critically received well but didn't sell much, due to the astronomical price and limited availability.

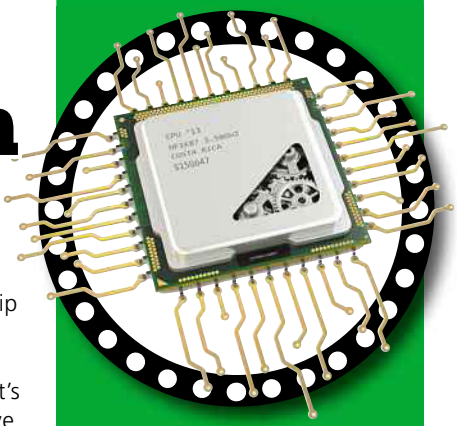
Samsung seemed pretty pleased with the results, though, enough for curved screens to be unleashed on its prime product line. The result of this is the Galaxy S6 Edge, and it's pretty much an S6 with some Edge embellishments. For this taste of the future you'll pay a hefty premium over the S6, but given that the S6 is a device born of its forebears and the S6 Edge is literally the cutting edge, there will be those willing to pay the price for futuristic bragging rights.

As for Samsung, the S6 needed to be good after two middling performers. With the S6 and S6 Edge, the company should feel it has done enough for now to continue to live long and prosper.

Mobile

Shielded From Boredom

Nvidia's exciting new Shield console casts a welcome cloud over Andrew Unsworth's TV



Before I kick off this column properly, may I first apologise for yet another column about Nvidia. Recently, not a week has gone past without Nvidia attracting attention, whether wanted or not. This is partly because Nvidia seems on fire at the moment and is seeking to move into and conquer new markets, and partly because last week it didn't properly brief its marketing department about the way its GTX 970 graphics card works.

This week, Nvidia has revealed its Shield console (**tinyurl.com/oxhl3j2**), an entertainment device intended to revolutionise the way we acquire and enjoy our music, films and games. From Nvidia's description of the Shield console, the device sounds like a cross between an Apple TV, an Android-based games machine and the OnLive games streaming service. We've seen Android-based consoles before, and although I've always admired the idea of one, the consoles I've seen, such as the PlayJam GameStick, haven't been as good as I'd hoped.

However, this console has a trick up its sleeve. Although it's an Android-based console, it'll play PC-quality games thanks to Nvidia's Grid gaming service. Grid lets you stream games straight to your Shield device, whether it's the Shield tablet or the new console, and the games range from Lego titles to more graphically challenging games such as Metro Last Light Redux and Saints Row IV. There are a good number of games already on the service (**tinyurl.com/o6njw2s**), but more are being added every week.

The Shield console is powered by Nvidia's powerful Tegra X1 mobile CPU, but even better than that is its Maxwell-powered, 256-core graphics chip, the same type of graphics processor used in Nvidia's desktop and mobile graphics cards.

Nvidia says this graphics chip will enable games developers to produce Android games with PC-quality graphics. That's something I think we'd all love to see.

However, Nvidia's website says you need at least a 10Mbps connection to stream Grid games. As someone who lives in the industrial heartland of Britain and still only gets a 3Mbps download speed, I'm of the many people who won't be able to use the Grid service thanks to this nation's crazy broadband infrastructure. This is disappointing. If people can't access the Grid service, a major appeal of the Shield console, even though the problem has nothing to do with Nvidia, then people may not fork out for one.

I wish Nvidia every success with the Shield console. Having one device plugged into your TV that satisfies all your viewing, listening and gaming needs is obviously a good thing, but buyers need to be convinced before parting with their cash. The Shield console could and should appeal to people who are not your typical computer geek or gamer, and I hope Nvidia has set enough money aside for promotion to snare such users. Here's hoping.

Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

The World Warrior

This year sees the release of three of the biggest names in the brawler genre: Dead Or Alive 5: Last Round, the ultra-violent Mortal Kombat X and Street Fighter V

This week, Ryan checks out the major fighting games on the horizon, and takes an early look at Lionhead's MMO Fable Legends...

Plug & Play

The one-on-one brawler may not be quite the phenomenon it was in the early 90s, when eager gamers were queuing up to play games like *Street Fighter II*, *King Of Fighters* or *Fatal Fury* in arcades, but 2015 sees the genre in rude, feisty health.

First, there's *Tecmo's Dead Or Alive 5: Last Round*, the latest update to a game originally released nearly two years ago. Out on 30th March, *Last Round* provides improved graphics, additional characters (including four from Sega's *Virtua Fighter* series) and, erm, improved 'jiggle physics'.

A series that has long placed its emphasis more on fast-paced action than complex moves and tactics, *Dead Or Alive* has, for some reason, always been sold on its roster of barely clothed female fighters. A pity, because puerile voyeurism aside, the *DOA* games have always been a lot of fun. It's as though developer Team Ninja is locked in a battle with the creators of the *Soulcalibur* series to see who can display the most bare flesh in their fighting games.

The *Mortal Kombat* series, meanwhile, has its own selling point: fatalities and gore. Where so many videogame franchises from the 90s have long since withered and died, *Mortal Kombat* has clung on, and its latest entry, *Mortal Kombat X*, is out on 14th April. Familiar faces like Sub-Zero, Raiden and Scorpion are joined by a range of new characters, while developer NetherRealm Studios has brought the *Mortal Kombat* series up to date with detailed 3D environments and physics effects. What everyone really cares about, however, is the quality of its finishing moves and, true to form, *Mortal Kombat X* looks nastier than ever: there's an X-ray mode, which allows you to see which of your opponent's bones you're breaking, and it's now possible to pull off heads, pop out eyes, melt faces with acid, and all kinds of other hideous fatalities.

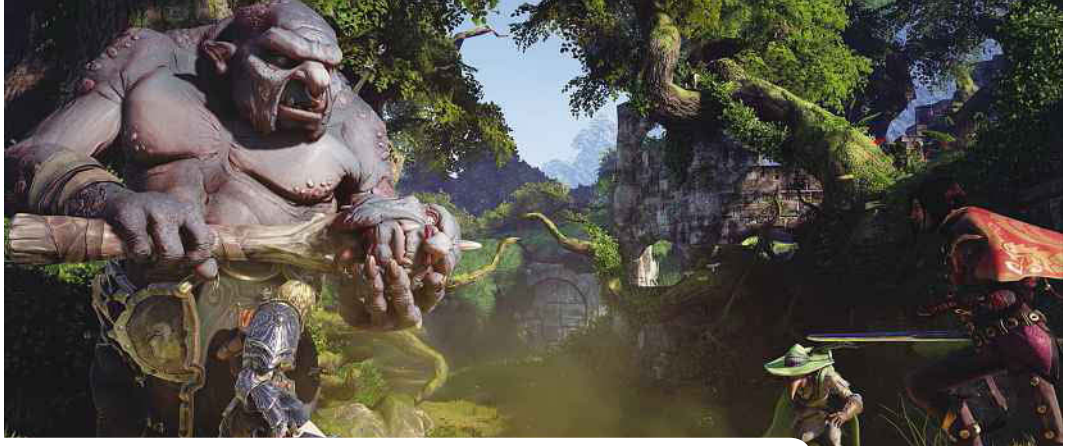
Towering above both *Mortal Kombat* and *Dead Or Alive* is, of course, the *Street Fighter* franchise. Since Capcom redefined the fighting genre in the 90s, the Japanese company has, to its credit, taken good care of the *Street Fighter* franchise. *Street Fighter IV* was a superb update, bringing its carefully balanced combos and iconic characters to a new generation while remaining true to the games that preceded it.

Street Fighter V appears to continue the trend, with new, more detailed iterations of characters like Ryu, Chun-Li and Charlie, and some spectacular-looking effects when a combo is successfully executed. Although we don't know exactly when *Street Fighter V* is coming out yet, we're guessing it's not too far away; Capcom recently announced that it's set to launch the "largest and most ambitious online beta program in franchise history" over the next few months. If Capcom can repeat the crowd-pleasing brilliance of *Street Fighter IV*'s multiplayer, then the franchise – and the fighting genre as a whole – should be in solid form for many more years to come.

You can keep up to date with *Street Fighter V*'s progress at **www.capcom-unity.com/street_fighter**.

Online

Announced in January, Lionhead's *Fable Legends* will take the studio's RPG series online for the first time. Allowing up to four players to join forces against a fifth player, who'll take on the dungeon-



Lionhead takes its hit RPG online with the forthcoming MMO, Fable Legends. While it's free to play, the studio maintains that it won't be a "play-to-win" type game

master-like role of controlling opposing characters, *Fable Legends* will, the studio recently announced, be free-to-play.

Legends will introduce a two-tier currency system, with silver and gold coins. Silver coins will be the most commonly encountered: either found or earned by completing quests, they can be spent on everything from new equipment to cosmetic items. Gold, meanwhile, is purchased with real-world cash, which will allow players to get their hands on equipment more quickly than collecting silver during quests. Despite this approach, Lionhead reassures us that "everything in *Fable Legends* that affects gameplay can be earned by simply playing the game".

The studio will also monetise the game via its roster of characters. "At any time, there will be four of these Heroes available to play for free," Lionhead says. "We will rotate the four Heroes available on free rotation, so you'll have a chance to play them all."

Here's the potential sticking point: you could have made a significant amount of progress with one character, but after three weeks, you'll be forced to choose another. Although your progress with the previous character will be saved, the system could make for a jarring experience, as you shuttle back and forth between heroes with lots of steadily acquired experience and those with none. You will, however, be able to buy characters with gold and silver and keep them forever, though we'll have to see how much that option will cost in terms of real-world cash or in-game grind.

Free-to-play minutiae aside, *Fable Legends* looks like a promising MMO. Lionhead is working on a story mode, which it will dish out in regular episodes, but it's the villain's role in the game that intrigues us most. For villains, *Fable Legends* will unfold like a real-time strategy game, as the player selects creatures and traps to place on the game map and hamper the progress of the heroes. In-game purchases rear their heads here too – you can buy creatures and other objects with silver or gold – but it could, nevertheless, prove to be a lot of fun.

You can find out more about *Fable Legends* at **www.fablelegends.com**.

Incoming

Like a mirage in the middle of the desert, the PC release of *Grand Theft Auto V* seems to recede further into the distance as we approach it. Once scheduled for 24th March, Rockstar's crime sim has now been pushed back to the middle of April – its second delay in recent months.

"Our apologies to PC gamers worldwide who have been counting down the days until the launch of the game," Rockstar said, "but a bit more time is needed to ensure that the game is as polished as possible, and to make certain that both Heists and the *GTA Online* experience are ready to roll out on day one for PC."

The good news is that *GTA V* certainly looks like a highly polished advancement on the game that console owners have been enjoying for months. And if the long-awaited Heists – the *GTA Online* DLC that will add a series of high-stakes robbery missions to the mix – is all we're hoping for, then the PC edition might just be the definitive version of an already acclaimed game.

Grand Theft Auto V is now scheduled for 13th April.

▲ *Grand Theft Auto V's long-awaited PC port has received another delay. It's now due out on 13th April*

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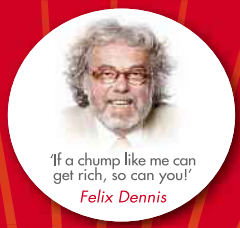

THE CRITICS

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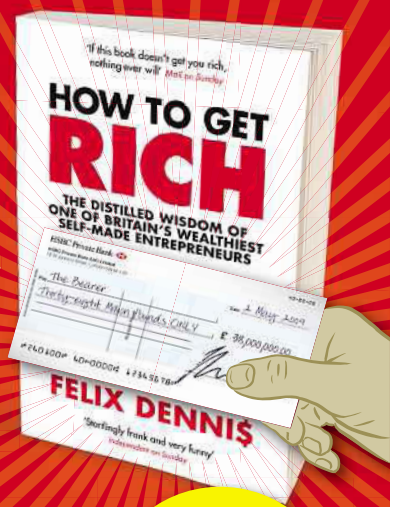
Mail on Sunday

'Well-founded advice based on hard-won experience'
Financial Times

'Full of honest insights. I strongly recommend this book'
Sunday Telegraph



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'Essential reading. A great work'
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21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
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51	52	53	54	55
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£3.40	£10.20	£20.40	£11.40	£22.80
£5.10	£11.90	£23.80	£13.10	£26.20
£6.80	£13.60	£27.20	£14.80	£29.60
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☐ Hardware wanted ☐ Software wanted ☐ General wanted

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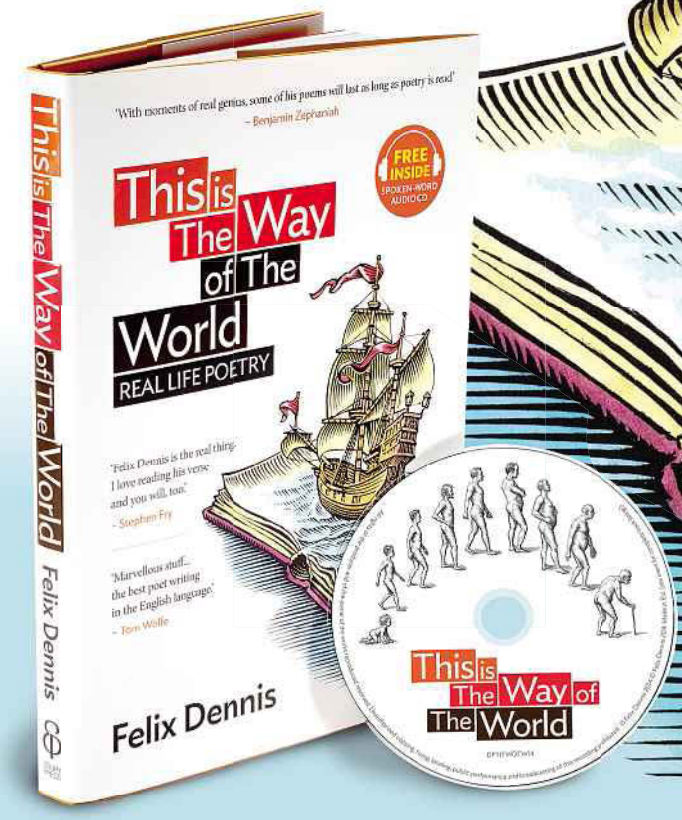

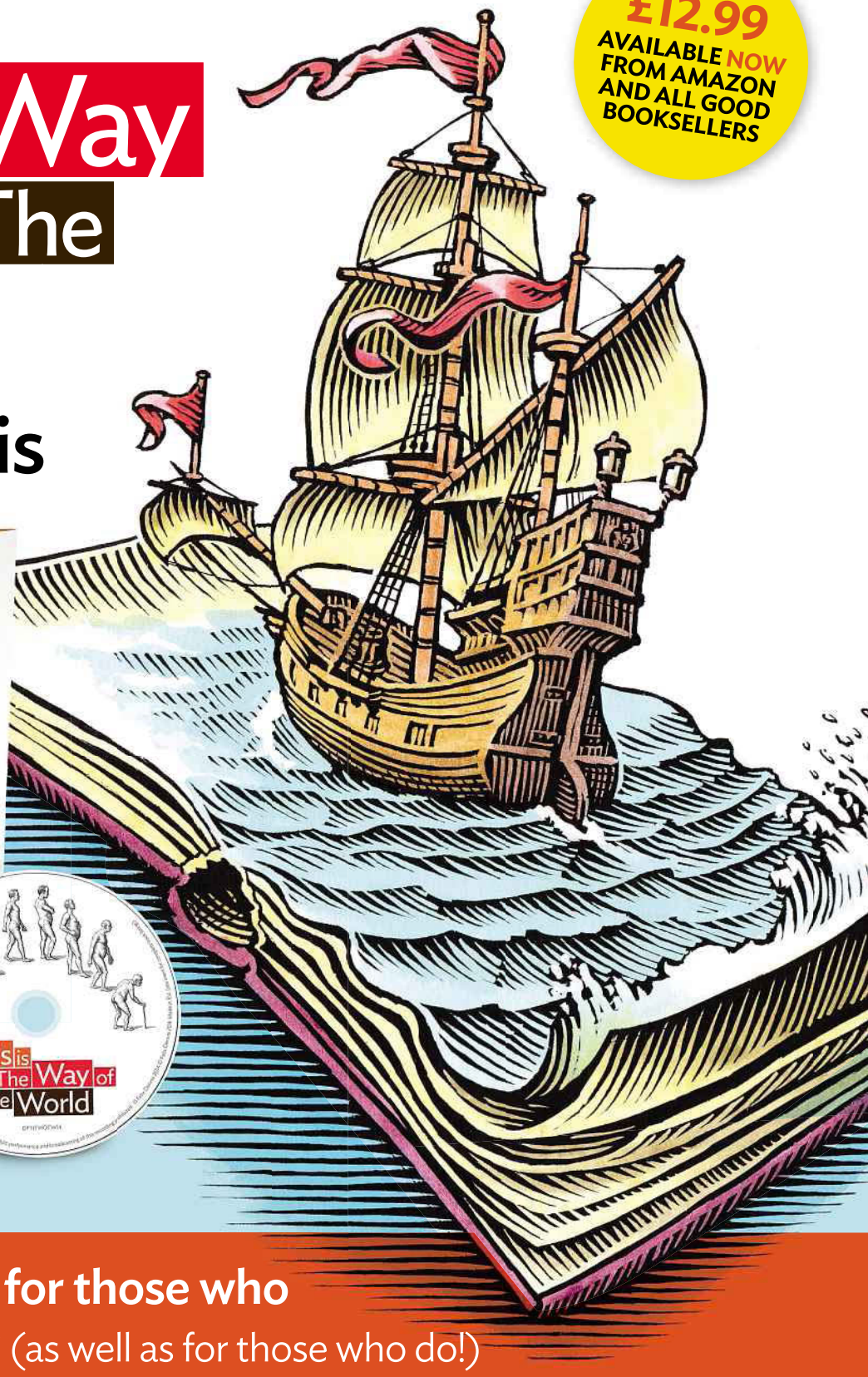

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HP Microserver n40l / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated, & completely updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/coa's. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16Gb memory and up to five hard drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/Islands. Payment by Cheque O.K subject to clearing, Paypal at £25 additional.(to cover their fees).
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Asus A8V motherboard, socket 939. Clips holding CPU cooler broke, CPU overheated & shut down. M/B should be OK and there is 4GB of ram on board. Free, collect only. North Wales.
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Email: arthur.pewty1@virgin.net
2 x 512MB PC3200 DDR400. These two sticks were removed from my working system, now redundant. £5, plus £1 P&P.
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Email: alan@asandco.co.uk

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Email alancox2823@gmail.com

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Email: printer.20.odaily@spamgourmet.com

WANTED: Acorn computer either an A5000 or A7000. Also book on teaching yourself binary.
Tel: (07817) 861011
Email: Johnhaviland73@gmail.com

WANTED: Corsair PSU cable bag. Please email me if you can.
Email: Paul@planetvoodoo.co.uk

Wanted: HD 3850 Graphics card, must be AGP. *Tel: (07817) 861011*

Wanted: Fully working mainboard for AMD socket AM2+/AM3, micro ATX size. Must use DDR2 RAM.
Tel: Brian Taylor (07570) 452557
Email: bmorgant@yahoo.co.uk

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Email: craigtin44@hotmail.com

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ASK AARON

Meet Aaron Birch. He's here to help you with any general upgrading, software and system building issues. He's got advice aplenty, and you're very much welcome to it!

Send your questions to:
Aaron Bich
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Window Locks

I've been a reader of the magazine for a good few years now, and find it really helpful and informative. I've recently had a small windfall and built myself a new rig with the remaining money after getting my home up to scratch, and have gone for Windows 7 rather than Windows 8. I have a Samsung 250GB 840 EVO SSD as my system drive and a WD 1TB HDD, split into three partitions, as storage.

However, I have a problem with placing and sizing windows on the desktop in as much as it doesn't matter where I size and place them, when I reopen them they seem to open in a different screen location. I often need the three WD partitions open to move items around and find it annoying and frustrating having to manually size and place them. Is there any way to make Windows 7 remember the size and position that I place them in?

I have looked in the registry (without making any changes) and have found a key named WindowMetrics, under HKEY_CURRENT_USER/Control Panel/Desktop. Could you please tell me if there a registry edit I could make to resolve this problem, and am I even on the right track? I tried Window Manager, but the trial has expired, and there doesn't seem to be much help online. If there is any other software you could recommend, I would appreciate it. If you can help, many thanks in advance.

Moss

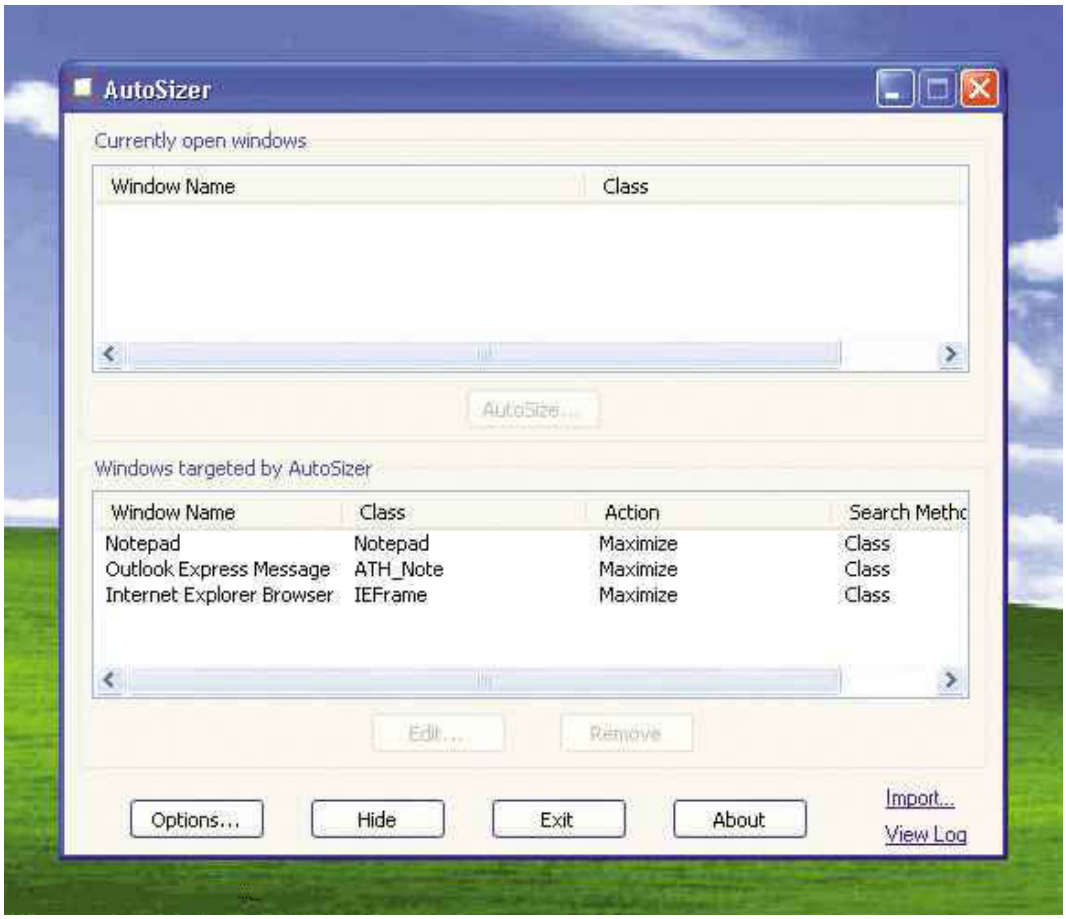
It's crazy that Windows isn't able to remember the placement and positioning of its own windows, but sadly, it's the case for the most part, and the only real way to add the kind of functionality you're looking for is to use a third-party program. The registry can be used to tinker, but it's not really advised. The key you found deals with window positioning, but won't really help here.

This being the case, I'd have to advise the use of other programs, such as Window Manager, which is one of the best options. As you've found, however, it's not free, and if you don't really want to pay for this feature, an alternative is needed.

*A good option is an older program called WinSize2 (**winsize2.sourceforge.net/en**). This should still work for Windows 7 and is used by a lot of people to add the very functionality you're looking for. It's also free, which ticks all of the boxes.*

*Other options you may want to check out include MaxTo (**www.winsplit-revolution.com**) and AutoSizer 1.71 (**www.southbaypc.com/AutoSizer**). MaxTo is a replacement for the older tool WinSplit Revolution, and sadly, isn't free, but AutoSizer is free and should also be useful. Like many options, this memorises window title names, along with their position and dimensions. So once you close and reopen them, they should open as you left them.*

Autosizer is one option for users wishing to keep windows positioning and size locked



Testing Patience

I am having problems with my HP PSC 1500 all-in-one printer. Every time I turn it on, it prints a test page.

I have cleared the print queue, but it continues to print a test page, even when printing a letter or other document.

I've tried everything I can to clear this problem but without success. The Help and Support files are a waste of time.

I'm getting very frustrated, especially due to the amount of ink and paper being wasted and the cost of replacement ink cartridges.

Can you suggest a solution to this problem, please?

Nina

I can sympathise with you on this one, Nina. There are a few HP printers that have this same problem, including a couple I've owned, and until it's sorted it can, indeed, be quite costly in terms of ink and paper. Luckily, there's a simple way around it.

The problem isn't actually a fault, as it may seem, but is just the way the printer deals with cartridge changes. Basically, it's asking for the calibration process to be completed, and until it is, it'll keep trying to complete this test. So to banish the problem, you just need to perform the full alignment – a process that HP doesn't do a great job of explaining. This isn't helped by this rather obnoxious insistence of the printer to get it done.

To begin, turn off the printer and then load some paper. Turn on the printer and allow it to print a test page. When this is done, lift the scanner lid and place the test page face down on the glass and close it. Now, press the Start button on the device, and the alignment process should begin. Allow this to finish, and when it's done, remove the test page.

You should now be able to turn off the printer and then turn it on again as much as you like without being harassed into performing the alignment test.

Some of HP's printer have a rather annoying and nagging alignment process, so it's best to get it out of the way quickly

Browser Migration

After many years of dependable browsing, Firefox has succeeded in forcing me away, thanks to a never-ending series of crashes, lock ups, errors and now the total inability to open any web pages without the browser shutting down. I've uninstalled, reinstalled, run in Safe Mode, removed add-on, you name it. Still, Firefox just refuses to work.

I'm aware that there's probably some way to fix it, but to be honest, I've had enough. Firefox was a great browser once, but now I find it's just a buggy mess, and I would like to move to pastures new.

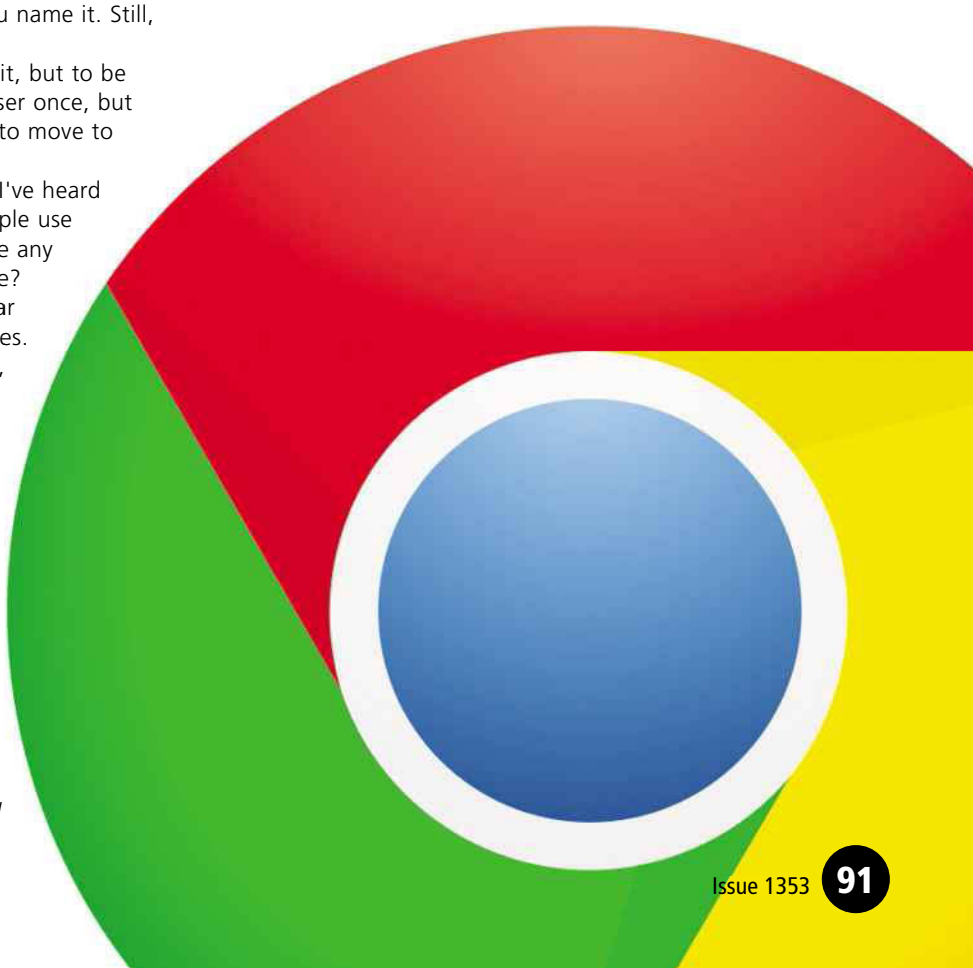
So I've decided to give Google Chrome a go, as I've heard it's a very good browser, and one that a lot of people use as their main app. I have one question first: is there any way to migrate all of my Firefox settings to Chrome? In particular, I'm keen to keep my bookmark toolbar links and, if possible, passwords and other favourites. I don't want to lose them. Because of this concern, I've held off on moving to Chrome, so I'd appreciate your input.

Graham

Chrome is a very good browser and one a lot of Firefox users have migrated to for one reason or another, including technical problems. Luckily, as part of the installation, you can carry over a lot of Firefox data, saving you plenty of time and effort. This data includes favourites, the bookmark toolbar (which will be recreated in Chrome) and even some passwords and logins, although not all may make it.

Simply install Chrome, and when prompted, allow it to import date from Firefox, and when you first open the new browser, you should see all your bookmarks and other favourites.

Google's Chrome browser can import a lot of your old browser's settings, so there's no need to manually add in everything



ASK JASON

Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

Chrome Finish

I recently bought a Chromecast. It's in the HDMI port on the lounge TV and happily streaming Netflix via my Hudl tablet (the original model). On the Hudl I've also installed the AllCast app, so I can now stream locally stored content, files I've downloaded to the micro-SD card. For some reason, though, not all files work – the TV just goes blank. Do you think the Chromecast's faulty, or haven't I set something up properly?

George, TalkTalk

Nothing's faulty or set up incorrectly, George. Rest easy about that. The problem is that the Chromecast supports only a very limited set of containers and codecs. Containers can be identified by a file's extension, and these are listed below.

***.mp4** (video and audio)*
***.webm** (video)*
***.wav** (audio)*
***.aac** (audio)*
***.mp3** (audio)*

Containers can hold media encoded in a variety of audio and video codecs, but in the case of the Chromecast only the following are suitable. These are the ones necessary to support the Chromecast's apps and delivery methods – Netflix, the BBC iPlayer, Google Play Movies, and so on.

***H.264** (video, used in .mp4)*
***VP8** (video, used in .webm)*
***HE-AAC** (audio, used in .aac and .mp4)*
***AAC LC** (audio, used in .aac and .mp4)*
***MP3** (audio, used in .mp3 and .mp4)*
***Vorbis** (audio, used in .webm)*
***WAV** (audio, used in .wav)*

I expect the videos you're struggling with don't use the right containers or codecs. Many videos downloaded from the web – especially those from dubious sources – use the .avi container, which is a non-starter. Also, while the audio in such files is often MP3, the video will typically be encoded in DivX or Xvid (derivatives of MPEG-4). Again, that's a non-starter.

The answer is to transcode (convert). The are transcoding tools that let you tweak every possible parameter a codec has to offer, and you can waste days trying to achieve optimum quality. Most of us, though, want a tool that gets the job done without fuss – quick and dirty. Try the accurately but unimaginatively titled H.264 Encoder: ***www.h264encoder.com****. It's free and weighs in at under 10MB (under 30MB once installed).*

It really is a click-and-go affair, yet the results are perfectly acceptable (use the High Quality preset). Even on my ancient Turion II M520 laptop, a one-hour video can be transcoded in only around twenty minutes.

Note – Another option is to buy a 99p micro-HDMI cable and get the videos onto your TV that way. The Hudl and Hudl 2 are quite unusual these days in having built-in micro-HDMI ports.

Making videos Chromecast-ready doesn't get any easier than this

Banned Width?

My current PC's getting on a bit, but it's still reliable and does the business. However, it's an LGA 1156 system, using a Core i3-530 and an ASRock H55M Pro. Naturally, there are no USB 3.0 ports, so I'd like to add some. Transcend's two-port TS-PDU3 PCIe ×1 card, costing about £8.50, seems to fit the bill, but I think I read some while ago that there are PCIe bandwidth issues on some older motherboards. Am I likely to come a cropper?

C Howell, Rutland

In theory, USB 3.0 moves data at 625MB/s. Sadly, the ×1 PCIe slots on LGA 1156 motherboards – that is, the PCIe slots coming from the chipset or southbridge rather than from the CPU – conform not to PCIe 2.x but only to PCIe 1.x (LGA 1155 and later platforms rectify this). Throughput in each direction is therefore 250MB/s, whereas it's 500MB/s for PCIe 2.x. On paper, you'd be wasting your money if you installed a USB 3.0 card into your ASRock H55M Pro.

Or would you? In practice, USB 3.0 actually tops out at about 200MB/s (USB 2.0, with its theoretical limit of 60MB/s, hits the wall at about 40MB/s). Acquiring that two-port Transcend card may not be such a bad idea, then. Of course, both ports will share the slot's single 250MB/s bandwidth allocation, so realistically you'll be limited to one USB 3.0 device at a time. Plug in two devices and the bandwidth for each will plummet.

Here's a question for you, though. What do you plan to use USB 3.0 for? Really, it's only purpose is for transferring data to, from, or between external storage devices. For all other tasks – with the possible exception of high-end printers – USB 2.0 is easily fast enough. Remember, too, that even the best spinners (mechanical hard drives) have transfer rates of only about 150MB/s – some 'green' or backup-aimed drives offer barely half that. You may not see the benefits from USB 3.0 you expect. Often, USB 3.0 only becomes worthwhile if you're using SSDs or top-drawer memory sticks. Having said that, as the Transcend card costs just £8.50, why worry?

Is it worth fitting a USB 3.0 card to an older motherboard?

Two Sides To Every Story

The contract on my Galaxy S4 finishes in a month or so, and I've got my eyes on the Galaxy S6 Edge as its replacement. As you know, the S6 Edge is pretty much the same as the standard S6 but with curved sides on the screen. Can you tell me what resolution these curved sides are? The single curved side on the Galaxy Note Edge is 2,560 × 160, added to the main panel. Are the sides of the S6 Edge the same?

Paul, Gmail

The panel on the S6 Edge has a resolution of 2,560 × 1,440, and I'm afraid that includes the curved sides. The panel on the Note Edge also has a resolution of 2,560 × 1,440 – but that's just the *primary* panel. As you say, Paul, the curved side is its own thing, a secondary panel with a resolution of 2,560 × 160. Technically, there's only one panel, but the two sections are configured as separate arrays.

On the Note Edge, when you're browsing the web, say, or watching a video, the image fills only the primary panel. This keeps things centred, with nothing rolling off the side. Makes perfect sense. The curved section can also be used for news tickers, media controls, Facebook updates, and so on. It comes into play in various ways, too, with the excellent S Pen stylus.

On the S6 Edge, however, *everything* rolls over the sides. For this reason, the curves are gentle, much gentler than the curve on the Note Edge. If you look at the Note Edge straight-on, the right-hand side appears to have no bezel. With the S6 Edge, the bezels are obvious. When the phone's face-down, the sides – the slivers still visible – can be made to flash different colours for different contacts when calls come in, but that's about it. There are no proper news tickers or anything.

In my view, Samsung's dropped the ball with the S6. With the S6 Edge, I'm not sure it's even on the pitch. The engineers were clearly told to push form over function, with the sole purpose of the curved sides being to add sex appeal. Worse, both models lack a micro-SD slot and removable battery – proud mainstays of every Galaxy S released previously.

Furthermore, the S5 was water-proof and dust-proof, despite having a detachable rear cover (to allow access to the battery and micro-SD slot). Quite an achievement. The S6 and S6 Edge have sealed, unibody frames, yet utterly bizarrely Samsung has elected to ditch the water-proof and dust-proof abilities altogether (apparently these will be brought back with the S6 Active). Staggering.

Galaxy S phones are often maligned for being plasticky (a flawed observation, I reckon), and it's clear Samsung's now attempting to address this by using 'premium' materials. As a result, the company's lost focus and the phones have lost their identity. The new models are little else but iPhones running Android. If the S6 Edge still meets your needs, Paul, by all means crack open the piggy bank. Please just make sure you understand what you're buying.

Samsung's Galaxy S6 and Galaxy S6 Edge: form over function?

Crowdfunding Corner

Like birds of a feather, these two Kickstarter projects are sticking together. Well, one sticks on your screen and the other sticks on any other surface. Fun!

ScreenStick

Gaming on a tablet sounds like a great idea, but in practise a lot of titles just don't suit touch input. Short of buying a Bluetooth controller – for which support is far from guaranteed – there's not a huge amount you can do. Except, maybe, look at something like this.

The ScreenStick is a device which uses rubber sucker pads to attach a joystick to your screen. The base contains capacitive contacts that mimic touch input, making it instantly compatible with a huge number of games. The input is far more precise than touch alone, making it ideal for action titles and fast-paced games that would otherwise be difficult to play on a tablet.

The ScreenStick comes in two varieties. The Simulator Stick (pictured) replicates the look and feel of remote-control joysticks, making ideal for simulator apps and high-precision input. The Gaming Stick, on the other hand, looks more like a console controller's thumbstick, giving it smooth movement and making it great for controlling cameras and navigating 3D worlds.

The cheapest tier costs £11 and gets you both a simulator and gaming stick and everything you need to attach it to your tablet for 30% off the RRP of £16. The project has blown past its £6,000 goal and delivery is scheduled for April 2015, so you shouldn't have to wait long to start playing!

URL: kck.st/1DDiOFQ
Funding Ends: Sunday, March 15th 2015

Podo

If you're a little too self-conscious (or generally upset with modern life) to use a selfie stick, don't worry – the Podo will take care of all of your self-photographing needs. This Bluetooth-controlled camera can be stuck and re-stuck to any surface, while allowing you to view the image from it via your smartphone. As soon as the shot is lined up, hit a button and it'll take the picture and transmit it instantly to you. It couldn't be simpler, really.

The camera itself is comparable to modern smartphones, with an 8MP sensor and 720P video capabilities. Its re-usable, washable sticking pad allows it to attach to almost any solid surface, but there's also a powerful magnet to help it stay on curved metal surfaces too. With an eight-LED flash, two hour battery and 4GB of internal storage, it looks like it would be a fun accessory for any casual photographer.

Earlybird pricing allows you to get a Podo for $79 (£51), against the suggested retail price of $99 (£65). If you miss the first wave of low pricing, though, you can still pay $89 (£58) – but if you pay the full $99 you get a free Kickstarter-exclusive photobook worth $20 (£13) on its own. Again, it's passed its $50,000 goal with plenty of time to go, so at this point you're as close to pre-ordering as Kickstarter's allows (which, admittedly, isn't THAT close).

URL: kck.st/1M2gzR4
Funding Ends: Tuesday, April 21st 2015

Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Guns 4 Hire

A Windows 8.1 app that's sheer carnage

The Windows 8 Store's gaming section is becoming quite a crowded place these days, with many of the featured games being free to play. Most aren't worth the bandwidth, but some are actually quite good – hidden gems, if you will.

Guns 4 Hire is one such gem. Published by Rebellion Games, this top-down, semi-isometric game makes for an interesting time waster and can be quite brutal as you move through the sections.

Total Destruction

You control four mercenaries, quite possibly the toughest squad of meat-heads on the planet. Lovers of the *Expendables* movies will no doubt see similarities between certain characters and the layout of the game.

The aim of the game is fairly simple: take on some crime lords and ruthless dictators, blow everyone and everything up and get paid for doing it. As it happens, pretty much everything in the game can be blown to smithereens, be they oil drums carelessly discarded to add a tactical advantage when blown up near the enemy – along with cars, road blocks, boxes, trees… you get the picture.

The gameplay is fairly linear: you'll follow a well-beaten track through the level, gunning all in sight, with the occasional jaunt down a side alley to collect a semi-hidden reward of some much needed funds, health or a weapon of some description.

Guns. Lots Of Guns

After the end of each level your payment is calculated and your score taken into account. The amount of damage dealt, how much of the mission you completed and side missions such as wiping out a most wanted target will earn you extra cash to spend in the store.

The store itself will grant you the ability to heal your team, purchase upgrades for the weapons you already have and add more to your arsenal. In addition, you can use real-world money to unlock further enhancements in the form of more in-game cash, better weaponry, armour and support items like mini-gun turrets, mines and grenade packs.

Looks Good

Surprisingly, *Guns 4 Hire* isn't a bad-looking game. You'd expect a free app/game to come with some okay graphics, but *G4H* is actually pretty good. Those of you who used to play the PS3 title *Zombie Apocalypse* will be familiar with the kind of game *G4H* comes across as.

Features At A Glance

- Manic battle ensue!
- Free
- Loads of gun play
- Not a bad looking game

The graphics are big, bold, colourful and full of detail. The explosions, splattering of the enemy as they walk into one of your grenades are graphically splendid, if you like that kind of thing, and the game has a good flicker-free backdrop to wander around in.

It's all about tactics as the game progresses, and rather than ploughing in, guns blazing, then standing there soaking up the bullets, you begin to use what cover is available and consider the careful deployment of the various means of support at your disposal.

Conclusion

As to how far you'll be able to progress without having to spend real-world cash is debatable, but for a free romp around and shooting everything for a few hours, you can't go far wrong with *Guns 4 Hire*.

Oh, the simple joy of making stuff explode!

The hard looking editorial team at Micro Mart

Logging Off

Here is a weird complaint, but I'll make it all the same. Flash drives are getting too big!

That might appear to be a counter intuitive thing to say in this publication, but I've been frustrated by the way that I'm forced to use 16GB or 32GB drives when the job I use them for needs 4GB or even less.

There's probably a psychological profile I fit, but there is something about transferring a 4GB DVD .iso to a 32GB flash drive and never using 28GB of it that really irks me.

A quick expedition to a popular online retailer revealed the extent of the bias towards bigger drives, because of the 137 different designs that were sold, 94 of them were 32GB in size. Only one drive was 2GB, two were 4GB, and 11 8GB.

Therefore, at the moment this isn't a critical issue, as the likes of Lexar still make the smaller units, but the writing is patently on the wall for 16GB and less. Logically, a couple of years from now 64GB will be the default or even 128GB, making my capacity gripes even greater.

What I really need a flash maker to do is design, say, a 64GB drive that you can sub-divide into 8GB chunks that you can select with a button. Yes, I know it's possible to already do this to a degree, through partitioning and a menu, but that won't work well if the PC reboots as part of the install of an operating system.

But flash drives aside, the more I think about this, the real issue here is probably my mind-set rather than the continuous strive towards greater capacities.

From the very beginning of my computing experience, space was always a challenge. If it wasn't someone trying to squeeze chess into 1K on the Sinclair ZX80, they were compressing PC files on the fly with Stacker or overburning DVDs.

Each new scale of storage we were presented was never actually sufficient, so all manner of tricks were deployed to use it more efficiently. But we're reaching a new threshold boundary now, where all my efforts to be space efficient might be a rather pointless and arcane exercise.

In the same way that most computers these days are generally fast enough, unless you're either massively impatient or running something exceptionally demanding, storage is generally bigger than you really need.

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It wasn't many years ago that every hard drive I owned was actually in use, unless it was so small I'd retired it. Now I have some large capacity devices that aren't in computers, which wait patiently on a shelf for me to use at some future date.

A quick fag-packet calculation reveals I've easily got 50TB or more in drive space, which is more than I can reasonable use unless my movie collection migrates to 4K or I record the entire rest of my life.

The future may be populated with storage devices where what is actually on them is miniscule compared with their overall size – something that those from my computing era would find perverse.

I sadly accept now that I'll either need to come to terms with the notion that storage space is inherently for wasting or be progressively irked from this point onwards.

Mark Pickavance

LAST WEEK'S CROSSWORD

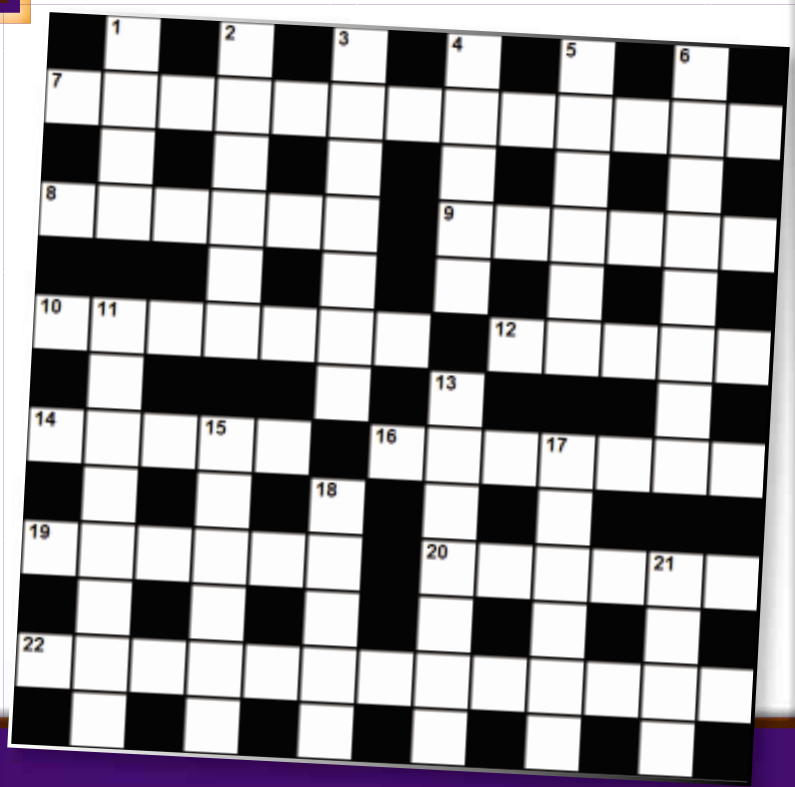
Across: 7 Lexicographer, **8** Pliant, **9** Libran, **10** Cloaked, **12** Staid, **14** UNCLE, **16** Jaggies, **19** Redcap, **20** Sonata, **22** Bibliometrics.
Down: 1 Bell, **2** Picasa, **3** Bootleg, **4** Troll, **5** Spybot, **6** Metafile, **11** Linkedin, **13** Napster, **15** Locale, **17** Genera, **18** Spoof, **21** Tact.

DISCLAIMER
The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. We know it happens every year, and we know we should be used to it by now, but we simply can't help getting excited the first time the sun properly comes out each year and we can comfortably walk around outside without a coat on. For us, that happened this week, and we were as happy as pigs in... erm... the back of van driven by animal rights activists, in the opposite direction to the pork farm from which we've just been liberated. Or maybe just poop. Anyway, the point is this week actually wasn't like walking around on the dark side of the moon, which we're guessing is probably pretty nippy (and dark). So praise Ra and every other sun god. No doubt in a few months we'll be complaining it's too hot, but let's not dwell on that just yet. For now, let's all enjoy the little bit of sunshine we have in the country while we still have it. You know it'll probably rain non-stop for the next two months anyway.

THIS WEEK'S CROSSWORD

Across
7 A comic magazine based on the British hero Dan Dare, featuring full colour stories written and drawn in the style of Frank Hampson. (9,4)
8 A style of orthography characterised by rounded capital letters; found especially in Greek and Latin manuscripts of the 4th to 8th centuries. (6)
9 Flight simmers will know the name of the company that makes the Pro Flight X-55 Rhino H.O.T.A.S. system for PC. (6)
10 An angular measurement in a spherical coordinate system. (7)
12 The official regulating body for TV, radio and other 'communication industries' in the UK. (Abbreviation) (5)
14 Land determined as contaminated under Part 2A of the Environmental Protection Act 1990. (Abbreviation) (5)
16 Open topped or convertible cars. (7)
19 Relating to or resembling the stars. (6)
20 An object of love. (6)
22 The notion that work expands so as to fill the time available for its completion. (10,3)

Down
1 Ctrl + O (4)
2 A split or division between strongly opposed sections or parties, caused by differences in opinion. (6)
3 Separate in order to protect or prevent interaction. (7)
4 An unwholesome atmosphere. (5)
5 A listing of prices for different goods or services. (6)
6 A periodic comet, which passed close to the sun in the spring of 1997 and was one of the brightest of the 20th century. (4-4)
11 This states that given some corpus of natural language utterances, the frequency of any word is inversely proportional to its rank in the frequency table. (5,3)
13 A trial environment where you can test something out online without worrying about breaking anything or catching a virus. (7)
15 To form an electric arc between electrodes of an arc lamp. (6)
17 A self-evident statement. (6)
18 An alternative strategy. (4,1)
21 The ability to connect to a mobile service away from home. (4)



In Next Week's Micro Mart*

- Security special!
- Keep your files safe with secure storage options
- How to choose an effective password
- The big guide to viruses and other malware
- Plus loads more, including the usual mix of news, reviews and advice

* May be subject to change

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